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THE

LONDON JOURNAL

OF

Arts and Sciences;

CONTAINING

REPORTS OF ALL NEW PATENTS,

WITH

DESCRIPTIONS OF THEIR RESPECTIVE PRINCIPLES AND PROPERTIES;

ALSO

Original Communications

ON OBJECTS CONNECTED WITH

SCIENCE AND PHILOSOPHY;

PARTICULARLY SUCH AS EMBRACE THE MOST RECENT

INVENTIONS AND DISCOVERIES

IN

PRACTICAL MECHANICS.

BY W. NEWTON.

VOL. X.

LONDON:

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AND W. NEWTON, CHANCERY LANE.

1825.

TO THE PUBLIC.

THE close of the Tenth Volume of the LONDON JOURNAL OF ARTS AND SCIENCES affords the Proprietors the pleasing opportunity of repeating their acknowledgments, for the very liberal and increasing encouragement which their efforts in the production of this work continues to receive. In furtherance of their pledge, and the accomplishment of the arduous task of describing the principles and details of *every new Patent Invention*, (which no other work has attempted to perform), neither expence has been spared nor exertion relaxed; and they feel confident that, considering the very great increase in the number of Patents which have been lately granted, the publication of a Supplementary Number, to complete the present volume, will be received as an acquisition.

In this volume, besides many Patents of very recent date, the Reports of all the Specifications Inrolled during the year 1824, are completed. There appears, however, upon a comparison of the

List of Patents which have passed the Great Seal, with those inrolled in the last year, that seven have not been specified, those Patents of course have become forfeited.

It may be necessary to apologise for some recent variations in the internal arrangements of the work, particularly for the few Original Communications which have been inserted. The leading object of this Journal is to show the progress of invention, and to form a complete Repository of Mechanical Science; it is therefore to be remembered, that all other matters are subordinate to the Reports of Patent Inventions, and while no one subject in this department of science is suffered to escape without notice Philosophical discussion and Polytechnic Intelligence must remain a secondary feature. As it is, however, the anxious desire of the Proprietors to render this work as acceptable to the general Reader as possible, and to promote that object arrangements are making, by which it is expected that a more extensive Miscellany of Scientific Information may be inserted, without trespassing upon those subjects which are intended to constitute the leading features of the LONDON JOURNAL OF ARTS AND SCIENCES.

LIST OF PLATES IN VOL. X.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. LVI.

Recent Patents.

To William Church, *of Birmingham, in the county of Warwick, Esq. for his Invention of certain Improvements on Augers and Bits for boring, and in the Apparatus for making the same.*

[Sealed 4th November, 1824.]

In our IXth vol. page 91, we gave notice of the extraordinary auger which forms the subject of this patent, and mentioned the very great facility which its peculiar form and construction afforded to the operative shipwright in boring holes in timber. We now proceed to describe the auger, and the machinery by which it is formed, and also the manner of keeping it sharp without altering its figure.

The auger is of that kind, known to some workmen by the name of the American, or screw auger, but differs from

it in several important particulars, such as its central guide pin, and its capability of being ground to a sharp cutting edge when it has become dull by use.—Plate I. fig. 1, shews the complete auger or boring bit, (for it may be employed as either). It is of a helical figure, formed by winding a bar of steel of a peculiar shape several times round a mandrel in an oblique direction, leaving spaces between the turns or threads like a cork-screw. The lower end of the auger is to be shaped into two sharp cutting edges, the one a gouge edge, cutting nearly in a horizontal direction, the other a knife edge, cutting vertically; the peculiar figure of the steel bar of which the auger is made, enabling these edges to be formed and kept sharp, by grinding upon an ordinary grindstone. There is a central pin, (shewn detached at fig. 2), introduced up the middle of the helical pod, and fixed in its place by screwing into the shank; the lower end of this pin is formed into a conical wood screw, which projects some distance below the cutting edges, for the purpose of drawing the auger into the wood as it is turned round in the operation of boring.

Fig. 3. shews a section or end view of the steel bar of which the auger is formed; its figure is described by the patentee as a "*mixtilinear trapeziod*, having two concave equal sides, and its two parallel sides unequal in the proportion of about four to one, the curved lines forming equal and very acute angles with the longest right lines." The width of the bar should be about two-thirds the diameter of the intended auger when finished, and the thickness of the bar between the two parallel sides should be about half the width of the broadest side. A piece of steel bar of the above description, long enough to form the helical pod of the auger, after having been welded to the shank is to be wound round a mandrel in the manner now to be explained.

Fig. 4. is a side view of the machine to be employed for forming the pod of the auger, and fig. 5, is a section taken at the end, that is with the end plate removed for the purpose of shewing the rollers, and the manner of their acting against the mandrel—*a*, is the frame or standard upon which the ends that support the rollers and the shafts are fixed, *b*, is the mandrel round which the steel bar is to be wound, having a suitable spiral groove formed in it for the steel bar to lay in; at the end of the mandrel there is a long screw, which works in a screw-box, *c*, at the end of the hollow barrel, *d*. The mandrel and screw are shewn detached from the machine within the section of the barrel, at fig. 6.

At the end of the axle of the barrel there is a toothed wheel, *e*, which is put in motion by a winch and pinion, *f*,—*g g g*, are three rollers supported in slots with adjusting screws in the heads or ends, *h h*; to these rollers three shafts, *i i*, are attached by universal joints; the reverse ends of these shafts are supported in slots in the end, *k*, and each shaft has a toothed wheel, *l*, affixed to its extremity, which takes into a pinion on the axle of the barrel. A bar of steel formed into the figure above described, by swaging, rolling, or otherwise, is now to be provided, and having reduced its end by cutting a notch and tapering, the tapered end of the bar is to be introduced into the groove of the mandrel under the chap, *m*, and there made fast by bringing down the upper roller, *g*, which is effected by turning the handle, and toothed wheel, *n*, above.

The barrel, *d*, is now made to revolve by turning the winch and pinion, *f*, and the mandrel being locked to the barrel by an internal tooth, revolves with it; but as the screw-box, *c*, which embraces the mandrel, is stationary, the thread taking into the screw causes the mandrel to slide along within the barrel, the effect of which is, that the bar of steel is

gradually passed into the recess or spiral groove round the mandrel, as it advances by the rollers, *g g g*, and the helical pod or cylindrical part of the auger is thereby formed in the helical groove. As the mandrel continues revolving, the forward end of the twisted steel bar comes against the pall, *o*, which stops its further advance, and the mandrel, as it proceeds, winds itself out of the auger.

The helical pod of the auger being thus formed upon the mandrel, a straight cylindrical passage is left up the middle of the pod, for the introduction of the axis pin, fig. 2; but, previous to inserting this pin, the end of the pod is to be ground upon a grindstone, to the two cutting edges above mentioned. It will be seen from the transverse section of the bar, fig. 3, of which the pod of the auger is to be made, that the bar has a broad and a narrow flat side, parallel to each other, and two concave sides, equal to each other in breadth, forming very acute angles with the broad flat side, and that when the bar is twisted helically, and held in a vertical position, these concaves will be immediately above each other, the chords of their arcs tending to a point in the centre of the auger. Now, the upper concave surface of the bar is to be considered as representing the hollow side of a gouge, a cutting edge to which may be produced by grinding away the steel on the reverse side of the bar at the end of the pod, into a convex form, corresponding to the concavity on the upper side; this cutting edge will therefore stand nearly in the direction of a radius, with its outer extremity bending a little upwards, and care must be taken in grinding this gouge cutter that the steel behind the edge be sufficiently removed to allow the gouge to enter the wood at a cutting angle. The knife or circumscribing edge of the helical pod is formed on the outside lower angle of the bar, by grinding away on the angular edge of a grind-

stone, so much of the steel between the edge of the lower angle and the center, as will leave a thin sharp cutting lip on the circumference, taking care that the circumscribing edge shall extend a little below the level of the outer angle of the gouge.

From a careful consideration of the above description, the manner of forming and grinding the auger will be seen, it is only necessary to add, that in all subsequent grindings for the purpose of sharpening the edges, the same methods are to be adopted, and in this way the auger, like a chisel, or gouge, may be ground repeatedly, as long as any of the twisted pod remains without changing its figure in the slightest degree. After grinding the auger, the center pin is to be introduced in the manner shewn at fig. 1, the length of its projecting point being determined by screwing the reverse end into the shank.

The auger thus formed will require no force whatever to project it forward, in the act of boring, as the conical wood-screw at the end of the center pin will draw it into the wood as it revolves, and the two cutting edges, which may be always kept sharp, will pass through the wood with so much facility, and in such advantageous positions, that a small power exerted in turning the auger round, will make it bore a perfectly smooth hole in the timber, delivering its chips at the top of the hole, as it goes on.

[*Inrolled May,* 1825.]

To Abraham Henry Chambers, *of New Bond-street, in the County of Middlesex, Esq. for his Invention of Improvements in preparing and Paving Horse and Carriage Ways.*

[Sealed 28th February, 1824.]

The subject of this Patent is an improved mode of

paving the streets of towns and highways in general, by depositing large regularly formed stones, with their broadest surface downwards, upon firm beds of earth, and fixing these stones when properly disposed, by pouring between the junctions a quantity of cement, and afterwards filling up the remaining interstices with broken flints; by which contrivances it is presumed that a more substantial paving may be produced than any heretofore made: and by adapting thereto the side trenches and under drains described in the same inventor's former patent for road-making; (see our first volume, page 353,) it is considered that the said improved paving will at all times be free from mud.

Plate I. fig. 7, is a section of the proposed road-way, *a*, is the bed of earth formed as a flat arch, and properly rammed down, or otherwise rendered perfectly firm and solid; on the sides are the bricked gutters, *b b*, into which the lateral trenches, *c c*, are made to lead, for the purpose of carrying off the wet. These trenches are to be filled with broken bricks, which will produce a filter, and allow the water only to run off through those channels.

The bed of earth is now to be covered with granite or other hard stones, cut or hewn into the form shewn upon an enlarged scale, at fig. 8, about eight inches square on the top side, and twelve at the base. These stones are to be placed side by side, upon the arched road, as at *d d*, their broadest surface downwards, and the junctions blocked by the middle parts of the stones in the next row, (as brick are commonly placed crossing the joints.) When the whole surface of the road has been thus covered over with the stones, arranged in order and close contact, a quantity of grout or cement, made of lime, or of the patent British pozzolane, is to be poured in between the joints, filling the lower part to about one-third the height

of the stone; when this has become hard, so as to cement the whole firmly together, the remaining interstices between the stones are to be filled to the upper surface with broken flint or other materials, that are insoluble in water.

By this disposition and mode of fixing the paving stones, it is considered that they will be prevented from sinking; and that roadways may be made more solid and durable than by any other plan heretofore adopted, and that the construction renders them capable of being kept free from mud.

[*Inrolled August,* 1824.]

To William Yetts, *of Great Yarmouth, in the County of Norfolk, Ship Owner, for an Invention of certain Apparatus to be applied to a Windlass.*

[Sealed 28th February, 1824.]

In this invention there are two objects, first to prevent the windlass from escaping from the palls, which are usually employed to hold it, and prevent its running back when weighing an anchor, by the adaptation of auxiliary palls; and secondly, to fix the windlass when wound up by means of a bar passed through one end of the apparatus, and driven into a mortice hole, in an iron rest attached to the deck of the ship.

Plate I. fig. 9. shews a section of the barrel of the windlass, *a*; the middle part of the barrel has a ring of teeth, into which teeth several palls and half palls, *b b b*, hanging from the post, *c*, are let fall, for the purpose of preventing the windlass from turning in a retrograde direction: this is a usual construction of a windlass. On

each side of the middle ring of teeth, a ratchet rim, *d*, is placed for the purpose of receiving the auxiliary palls, *e* and *f*, which is the improved part. These auxiliary palls are fastened by a leg, *g*, with a joint at bottom to the deck of the ship, and lay over part of the periphery of the toothed ring. At the top of the pall, *f*, which is jointed to *e*, a chain, *h*, is attached, extending to a spring plate, *i*, with a staple, on the post, *c*, for the purpose of keeping the palls close upon the ratchet rims, and at the same time allowing them to rise to let the ratchets pass, as the windlass goes forward.

Should an extraordinary strain of the windlass cause the palls, *b b*, to jump from the teeth of the ring, the auxiliary palls, *e* and *f*, standing at about a quarter of an inch from the teeth of the ratchets, would immediately catch the windlass, and prevent it from retrograding further, the leg, *g*, being so securely bolted to the deck, as to resist the utmost strain of the recoil.

Fig. 10, shews the mode of securing the windlass when stationary; *a*, is a section of the barrel, in which the usual apertures are made at right angles to receive the hand-spikes, through one of these apertures, the bar, *b*, is driven resting in a hook at *c*, which is held by a rod and staples to the deck, and in a mortice at *d*, in the braced standard of iron, which is firmly bolted to the deck. This contrivance has been wholly invented by the patentee, but as he has employed the bar resting in the hook, *c*, for several years, he only claims the standard and mortice, *d*, in this part of the invention, under the present patent.

[*Inrolled, April*, 1824.]

To Rev. Moses Isaacs, *of Houndsditch, in the City of London, for his Invention of certain Improvements in the Construction of Machinery, which, when kept in motion by any suitable power or weight, is applicable to obviate concussion, by means of preventing counter-action, and by which the friction is converted to a useful power for Propelling Carriages on Land, Vessels on Water, and giving Motion to other Machinery.*

[Sealed 19th February, 1824.]

The projects contained in this specification as far as we can comprehend them, are the most futile and ridiculous that we ever remember to have met with. The patentee proposes to prevent concussion in travelling carriages, by making the spokes of the wheels elastic, and by the introduction of bevel gear in a way that we do not understand, to take up the friction of revolving axles, and to use that friction as part of the impelling power.

The first of these schemes, the elastic wheel, is shewn in Plate II. at fig. 3. It consists of an external rim and tire as usual; a nave with the axle passing through it, and a series of arched spokes made of canes, steel plates, or any other material that will bend. The inner extremities of these spokes are confined between two hoops upon the nave, and their outer extremities let into the rim. As the wheel rolls forward and passes over obstructions in the road, sudden concussions take place, when the momentary increased pressure of the carriage being received by the elastic spokes, the effect becomes dissipated, and the body of the vehicle not only moves on without jolting, but is propelled forward by the spring of the wheels.

To provide against an accidental overthrow of the carriage,

it is proposed to suspend from its upper part, a sliding rod shewn in section at fig. 4. As the carriage falls over, the rod, *a*, shoots out of its socket by its own gravity, and coming in contact with the ground, is prevented from sliding back by the spring nipper, *b*, taking hold of the ratchet teeth upon the rod, and thereby causing it to prop the carriage; at the same time another prop is disengaged, but by what means we do not comprehend, which coming in contact with the ground, stops the further progress of the vehicle.

By the employment of bevel wheels and pinions, in some manner which is not described, it is conceived that the ordinary friction of axles may be transferred, and the effect of the friction made to aid the propulsion of the machinery.

Lastly, it is proposed to improve the effect of steam engines adapted to propel carriages on land, and vessels on water, by a peculiar construction and disposition of boilers, furnace, and steam pipes, which contrivance is exhibited at fig. 5; *a b c*, are three boilers generating steam; *d e*, are the two cylinders of the engine: *f*, and *g*, are the piston rods, attached to the vibrating beam, *h*; *i i*, are two rods attached to the beam, and to the vessel, *k*, at bottom, which turns upon pivots in bearings; this vessel, *k*, is intended to contain the furnace for heating the boilers; *l*, is a steam pipe leading from the boiler, *c*; *m*, is a similar pipe leading from the boiler, *a*; *n* and *o*, are also steam pipes leading from the boiler, *b*, which respectively enter the short pipes, *p* and *q*; *r* and *s*, are spring rods attached to the vibrating beam and to the steam cocks.

Steam being admitted into the upper part of the cylinder *d*, by the pipe, *l*, from the boiler, *c*, the piston will be depressed in the cylinder, *d*, and the rods, *i i*, will place the furnace, *k*, in the position seen in the figure, the action of the fire being turned from the boiler, *c*, to the

boilers, *a* and *b*. The descent of the beam will now cause the spring rod, *r*, to open the cock and admit the steam from the boilers, *a* and *b*, to the lower part of the cylinder, *d*, which is intended to raise the piston, and cause the steam that occupied the upper part of the cylinder, to be driven back through the pipe, *l*, into the boiler, *c*, from whence it proceeded.

By similar means, throughout the whole action of the engine, the steam admitted on one side of the piston, is intended to drive back that which presses against the reverse side of the piston, the movement of the vibrating furnace being expected to cause a sufficient variation of temperature between the boilers, to allow the effect to take place. It is considered that this disposition of the furnace, boilers and pipes, will prevent any concussions of the alternating machinery.

[*Inrolled August*, 1824.]

To JOHN HEATHCOAT, *of Tiverton, in the County of Devon, Lace Manufacturer, for his Invention of an Improved Economical Method of combining Machinery used in the Manufacture of Lace, in weaving and in spinning by power.*

[Sealed 9th March, 1824.]

THE objects of this invention, as stated by the patentee, are to diminish the cost of erecting an extensive building, or works for the manufacture of lace and other such goods formed of filaments: to afford the means of lighting such manufactories more completely than can be done upon the ordinary plans of building: to enable such extensive pre-

mises to be warmed and ventilated uniformly throughout: to give a greater stability to the whole erection, than has been heretofore effected by any known method of building: and to enable an overseer to observe the movements of all the work people, and the machines in every part of the premises at the same time, from an elevated central situation.

In order to diminish the expence of erecting such works, it is proposed to connect a framing of iron upon the ground, and after making it perfectly secure and firm in all its parts, to raise upon this framing upright pillars of iron, with cross bars and braces, which pillars and cross bars are to form the frames and standards of the lace machines, spinning machines, looms or other machinery, for the operation of which the works are erected. On the top of the first series of pillars, which form the frames of the machine or basement story, the iron braces and horizontal bars to support the floor of the first story are to be erected; upon these are to be raised the upright iron pillars, and the cross bars and braces, which shall constitute the frame work of the machines on the first story; and in the same way are to be erected similar pillars and cross bars, for the floor and framing of the machines on the second story, and above these for the third and higher stories; the whole forming a compact and firmly connected framing of iron, in which the parts of the several lace making machines, spinning machines, looms or other machines, are to be mounted, their internal constructions and modifications constituting no part of the present invention; but they are to be actuated by a rotatory power, as a water wheel or steam engine, communicating its motion to the whole by shafts and bevel gear.

It is intended to erect such framing of iron in a quadrangular form, leaving a large open area in the middle; two rows of machines are to be placed along each side, with an alley down between them. The whole is to be circum-

scribed with a wall of brick work, having very large windows, the brick work being merely a shell for enclosing the iron erection, and is not intended to form any part of the support, excepting in giving its assistance to bear the roof. The machines will thus be placed round the building in galleries, and in addition to the large windows in the walls, an extensive sky-light, or several sky-lights may be inserted in the roof, to give light to the whole of the interior.

Works erected in this way will admit of a more perfect mode of warming and ventilating, by the introduction of heated air through apertures in the pillars, or otherwise, and by carrying off the deteriorated air through the roof. Stability is given to the erection, by the firm union of the upright pillars, and the horizontal bars, by means of braces, secured by screw-bolts or other fastenings, passed through flanges or staples, so as to bind the whole of the iron work together, and which the patentee considers will render it a stiff inflexible frame, capable of supporting the above described machinery, and of resisting the vibratory effects of concussion, which is so prejudicial in the operation of delicate mechanism, such as lace frames, spinning frames, &c.

In the centre of the quadrangular area, it is proposed to erect an elevated situation for the overseer, where he may observe every part of the works, and the operations of the work people; the top of this central erection may also be made to support the roof which covers the whole.

It is not thought necessary to state dimensions, as they may be varied according to circumstances, neither does the patentee confine himself to the erection of buildings that have four equal sides, but rectangular sides are essential to the principles of the plan, otherwise the pillars and cross bars could not be adapted to the framing of the machinery.

[*Inrolled, September* 1824.]

To AUGUSTUS APPLEGATH, *of Duke Street, Stamford Street, Blackfriars, in the County of Surrey, Printer, for his Invention of certain Improvements in Machines for Printing.*

[Sealed Feb. 19, 1824.]

THE improvements claimed under this patent have two objects; 1. to save the room occupied by the inking tables employed in some of the patentees' improved printing machines; and, 2. to construct a printing press with two cylinders, which shall take the impression rapidly from one form, and thereby expedite the process of printing.

Plate II. fig. 1, shews the improved mode of distributing the ink upon the periphery of a revolving cylinder, which communicates it to the inking rollers, and these to the form of types; *a* is the printing cylinder, which is supported in suitable bearings, and made to revolve by the ordinary means; *b* is the form of types, with its table running backward and forward as usual, for the purpose of bringing the paper under the printing cylinder, where the impression is given; *c* are the inking rollers; *d* is the distributing cylinder, turning on pivots in the levers or arms, *e*. These levers are supported by rods, *f*, upon which are small rollers, *g*, running against the periphery of cam wheels, *h*, upon each end of the axle of the printing cylinder. At the time that the roller, *g*, is acting upon the periphery of the smaller diameter of the cam wheel, *h*, the table and form of types are passing under the inking rollers and receiving the supply of ink, the distributing cylinder, *d*, being at its lowest point. As the printing cylinder, *a*, goes round the toothed rim

on its edge, actuates a toothed wheel, *i*, which takes into a smaller toothed wheel, *k*, and that into another wheel, *l*, on the axle of the distributing cylinder, *d*, which is thereby made to revolve; *m* are the ductor rollers in the ink trough, giving a supply of ink to the cylinder, *d*, as it passes; *n* are the distributing rollers which go round as the cylinder, *d*, turns, and having a side movement as well as the rotatory motion, spread or distribute the ink upon the periphery of the cylinder, *a*.

When the point or longest diameter of the cam wheel, *h*, is acting against the roller, *g*, the lever, *e*, will be drawn up by the rod, *f*, and the surface of the cylinder, *d*, will be brought in contact with the rollers, *c*, as shewn by dots in the figure, and at this time communicate the supply of ink to the rollers. The table and form of types are now under the printing cylinder, giving the impression to the sheet of paper; but as the printing cylinder goes round, the cam wheel causes the lever, *e*, to descend with the distributing cylinder, when the table and form runs back again, passing the types under the roller, *c*, by which means they receive their ink.

Fig. 2 is an end view of a printing machine, with two printing cylinders, adapted to one form of types; *a a* is the framework, at the upper part of which two strong end pieces, *b*, of iron are suspended upon a strong axle: these end pieces carry the axles of the two printing cylinders, *c* and *d*, with toothed rims at their ends, and their toothed wheels, *e*, *f*, *g*, and *h*, all of which wheels take into each other as a train; *i i* is a large toothed wheel, to be actuated by steam or other power, which turns a small toothed wheel, *k*; upon the axle of this there is also a similar toothed wheel, which takes into the teeth of the wheels, *e* and *f*, and thus the train i

actuated, and the printing cylinders, *c* and *d*, made to revolve.

Upon the face of the large wheel, *i*, there is an eccentric groove, *l l*, in which a stud attached to an arm, *m*, extending from the side of the end piece, *b*, is intended to act; and as the large wheel goes round, the eccentric groove moves with it, and by means of the stud and arm, *m*, draws the end piece, *b*, into such positions as will bring the printing cylinders, *c* and *d*, alternately into the proper situation for giving impression to a sheet of paper as the form of types, *n*, passes under it.

The general operation of the machine will be this; the sheet of paper from the heap, *o*, being placed at *p*, will be drawn by the endless tapes over the periphery of the drums, *g* and *e*, and be thence conducted to the periphery of the printing cylinder, *c*, where the form of types as it passes under the cylinder, *c*, gives the impression to the paper.

By the time that the form of types has passed under the cylinder, *c*, and the paper has received the impression, the stud of the arm, *m*, has by the revolution of the wheel, *i*, proceeded through that part of the eccentric groove which has the shortest diameter; but now the stud passing into the most distant part of the groove, draws the end pieces, *b*, into that position which will bring the printing cylinder, *d*, into the situation which *c* had occupied, ready to give the impression to the sheet of paper upon its periphery, as the form of types returns.

In this way the two printing cylinders are, by their pendulous motion, alternately brought to act upon the form of types, so as to obtain successive impressions without rendering it necessary for the table and form to

travel through a space farther than is equal to the circumference of one of the cylinders; by which means great dispatch in the operation of printing can be effected. The table is made to move by a connection to the wheel, *i*, or by any other convenient means, and the inking rollers may be conducted along over the form by a rod extending from the pendulous end piece.

[*Inrolled August* 1824.]

To JOHN HEATHCOAT, *of Tiverton, in the County of Devon, Lace Manufacturer, for his Invention of a new Method of Manufacturing certain parts of Machines used in the manufacture of Lace, commonly called Bobbin Net.*

[Sealed March 9, 1824.]

THIS invention applies to the manufacturing of a certain part of a lace machine, called the bobbin carriage. These carriages are variously shaped on their outer edges, suited to different constructions of lace-making machines; but in all of them, a circular bobbin, formed by two thin plates, about the size of a half crown, but not more than one-fourth its thickness, is mounted, turning in a circular aperture in the carriage, with a spring to retain it. Such bobbin carriages are usually made of plate brass or iron, cut or stamped out to nearly the desired form, and are afterwards trimmed up and finished by filing. It is, however, the patentee's intention to complete the formation of such bobbin carriages, by placing them in a die, and stamping them smooth, after they have been cut to the form, instead of

trimming them up by hand, as heretofore, by which means the edges and other parts will be pressed, so as to produce the bevels or recesses which may be required to enable them to pass freely through the machines in which they are to be mounted.

[*Inrolled September* 1824.]

To JOHN HEATHCOAT, *of Tiverton, in the County of Devon, Lace Manufacturer, for his Invention of certain Improvements in Machines now in use for the Manufacture of Lace, commonly called Bobbin Net, and a new method of manufacturing certain parts of such Machines.*

[Sealed 9th March, 1824.]

THE first subject contained in this specification is a mode of regulating the delivery of the warp threads, in the same ratio as the lace coils upon the work roll, in order to prevent the meshes of the net being elongated toward the end of the piece; the second is a mode of cutting plate brass, or other metal, into segments of circles, by means of a lathe; these segments being intended to form the curved pieces on which the bobbin carriages slide, in lace frames of one particular construction.

Plate II. fig. 6, is an end view of a lace machine, to be worked by a rotatory movement, having the improved parts attached; *a* is the beam or roller, upon which the warp is wound; from hence the warp threads pass up toward the work beam. At the end of the warp roller, and affixed to its axle, there is a toothed wheel *b*, which takes into the teeth of a pinion shewn by dots; upon the

axle of this pinion there is a large pulley, *c*, and round this pulley two tension cords, *d* and *e*, are carried, with weights at their extremities. The cord, *d*, is fastened at one end to the frame of the machine, and passing round the pulley, *c*, is kept tight by a suspended weight; the cord, *e*, is attached to a lever, *f*, and after passing round the pulley, *c*, in the reverse direction to the former, is also kept tight by a weight; *g* is an upright rod, which is made to slide in a vertical direction, by the rising and falling of a lever, *h*, that bears against a roller at its lowest end, which lever is actuated by eccentrics or tappets attached to the main revolving shaft, *i*, in any of the ordinary modes.

On the sliding rod, *g*, there is a small pin that the lever, *f*, bears upon, and as the rod ascends and descends, the lever rises and falls also. The rising of the lever, *f*, draws up the cord, *e*, and its weight, a short distance: and, in so doing, turns the pulley, *c*, through a small portion of a revolution: the pinion upon the axle of the pulley at the same time turning the toothed wheel, *b*, and the warp roller, which causes a portion of the warp to be given out. On the descent of the lever, *f*, the cord, *e*, becomes slackened: and as the cord, *d*, is held tight round the pulley by its tension weight, the cord, *e*, is drawn down to its former situation, without causing the pulley to retrograde. In this manner, by the lever, *f*, successively rising, the warp roller is progressively driven round, and the warp delivered.

As, however, the accumulation of the lace net upon the work roll, or beam, would enlarge its diameter, and consequently increase the tension of the threads, so as to distort the form of the meshes, a provision is made, which will compensate for this enlargement of the work

roller, by making its rotation depend upon means, not immediately connected with the progress of the warp roller.

In the upper part of the machine, there are two conical rollers, *k* and *l*, shewn side-ways at fig. 7; to which the ends of a cord or wire is attached, and in putting the machine to work, this cord or wire is wound round the cone, *k*, fixed upon the shaft of the work roll. As the perpendicular rod, *g*, rises by the means before described, the cross piece at the top of that rod pushes up a sliding spring catch, *m*, on the side of the standard; which catch, every time that it ascends, drives the ratchet wheel, *n*, one tooth forward; a pinion on the axle of this ratchet wheel takes into the teeth of a toothed wheel, *o*, at the back of the cone, *l*, and thus, by the repeated actions of the rod, *g*, and catch, *m*, the cone, *l*, is progressively driven round. Now the cord or wire which is coiled round the lower cone, *k*, upon the axle of the work roll being fastened to the upper cone, *l*, it follows, that as the cone, *l*, turns by the means just described, the cord or wire will coil round it, and be drawn off the cone, *k*, by which means the cone, *k*, and the work roll, will be made to turn slowly, and the lace net will be wound upon the roll as it is formed in the machine.

The largest diameter of the cone, *l*, is the part round which the cord or wire is first coiled, and being drawn from the smaller end of the cone, *k*, the rotation of the work roll will consequently be most rapid at the commencement, when the work is first taken up; but as the lace accumulates on the work roll, and its diameter increases, the coiling of the cord or wire will approach the smaller end of the cone, *l*, and draw from the larger end of the cone, *k*, consequently the rotation of the work roll

will now be slower, and the lace be taken upon the work roll with exactly the same speed as when the operation began.

The second subject contained in this specification, is a mode of forming curved pieces of metal in a lathe. The patentee proposes to place a flat piece of metal, of the thickness required, in a standard opposite to the head of the lathe, and to confine the piece of metal firmly by screws and clamps, so that it shall not move; a double cutting tool is then placed in the lathe, that is a cutter with two points at a proper width apart, and at such a distance from the centre, as will describe the curve of the piece of metal to be cut; the lathe being now put in motion, the cutting tool will revolve, and the standard, with the piece of metal, being slidden along so as to bring it up against the cutters, the piece will be cut out to the desired curve.

When one piece or segment of metal is thus formed, the plate from which it was cut is to be shifted in its standard, and, on bringing up the standard, another segment may be cut in a similar way, and so on until the whole of the metal is used. In this manner, it is proposed to form those curved pieces upon which the carriage of the bobbins slide, in the interior of the machine.

[*Inrolled, November,* 1824.]

To THOMAS HANCOCK, *of Goswell Mews, Goswell Street, in the County of Middlesex, Patent Cork Manufacturer, for his new method of making or manufacturing an article which may be, in many instances, substituted for Leather, and be applied to various other useful purposes.*

[Sealed Nov. 29, 1824.]

THE patentee proposes to make this material, which shall be used in many situations as a substitute for leather, by coating fibrous substances with a liquid elastic gum, such as caoutchouc; his process is, first to prepare a quantity of the fibres of flax, cotton, wool, or other such material, by hackling or carding them, and then laying them in straight layers, of suitable thickness, when the material is to be soaked with water in a trough, or felted together, after which the water is to be pressed from the fibres, by passing them between a pair of rollers, or by any other convenient pressure.

The material will now have become stiff, and it is in this state to be coated with what the patentee calls native elastic liquid gum, which he considers to be the same as that which is commonly called Indian rubber. This material is to be laid on by means of a spatula or other convenient instrument.

After the material has been thus prepared, it is to be pressed between plates or boards, to render it flat, and after the last coat of the gum, the material is to be passed through rollers.

Straps are to be made in this way, by laying the material in wooden moulds, and if the long fibres of flax are employed, they may be mixed with short filaments of cotton. Wooden troughs, as moulds, are proposed to be

used for laying the materials in, instead of metal, as metal will tinge or discolour the substance, but when it is to be coloured black, in imitation of leather, then this precaution is unnecessary.

[*Inrolled May* 1825.]

To FRANCIS HENRY WILLIAM NEEDHAM, *of Davis Street, Fitzroy Square, in the County of Middlesex, Esq. for his Invention of an improved Method of Casting Steel.*

[Sealed October 1.]

THESE improvements in casting steel, consist in melting the steel in large quantities in capacious pots, crucibles, or other suitable vessels, which are to be fixed in furnaces, and when so melted, the steel is to be run from the fixed crucibles, through lateral tubes to the mould, instead of withdrawing the melting pot from the furnace and pouring off the metal, as in the ordinary mode of casting.

In the furnace (which may be constructed according to any of the usual plans) it is proposed to fix the crucibles or melting pots upon fire brick or stone bearers, so as to allow the fire to envelope them in a similar way to the retorts for generating gas. The crucibles or melting pots are to be made of fire stone, Stourbridge clay, or any other material that will sustain the action of the fire; they are formed something in the shape of troughs or deep dishes with moveable covers, and are placed upon the bearers, inclining a little from the horizontal. At the lower part of the crucible, an aperture is made, from which a tube extends to the outside of the furnace,

and when the steel is perfectly fused, a plug or stopper is to be withdrawn from the outer extremity of the tube, and the fluid metal allowed to run off, which the inclined position of the crucible will facilitate.

In this way, a single crucible or melting trough, or two or more crucibles or melting troughs, may be fixed in one furnace, the fire being made to act upon them all at the same time, by which means a larger quantity of steel may be fused for casting than in the moveable crucibles, and consequently articles of greater magnitude and substance may be cast in steel by these means, than by the modes heretofore adopted.

As different qualities of steel require different degrees of heat to bring it into fusion, it will be necessary to place that steel which is least fusible in the crucible most powerfully acted upon by the fire, and the more easily fusible in the upper crucibles; by which means the patentee considers, that he shall be enabled in casting large and heavy articles, such as shafts or cylinders, to employ steel of the best quality in casting such parts of the article as require it, and an inferior kind of steel in the other parts; consequently he expects to produce such articles at a less expense. For instance, in casting a large cylindrical roller of steel, the interior of which might be of an inferior quality of steel, he places a cylinder of wrought iron within the mould as a partition, and causes jets of fluid steel of dissimilar qualities to flow at the same time from two of the crucibles into the mould, by which means the fluid steel would adhere to the wrought iron cylinder, and thereby form a solid roller. In casting articles of smaller dimensions in steel, such as horse shoes, hammers, axletrees, and other things which have usually been forged, it is proposed to employ portable iron moulds which when properly braced together are to be brought under the jet of fluid

steel, and held in such positions that the metal may flow into the bottom of the mould, and thereby drive the air upwards, which must be allowed to escape through small apertures.

The specification concludes by saying the claim of invention consists in "employing fixed crucibles or melting pots for the fusion of steel, which are to be seated in a furnace, and in causing the fluid steel to flow through pipes or tubes, from the crucible to the moulds. In adapting this invention, I do not mean to confine myself to the form or dimensions of the melting pots, but employ such forms and dimensions as circumstances may render eligible; neither do I confine my invention to any particular form or construction of furnace, but mean to employ such furnaces as may be found best suited to the adaptation of my invention."

[*Inrolled, April,* 1825.]

To ROBERT DICKINSON, *of Park Street, Southwark, in the county of Surrey, Esq. for his new invented Improvement or Improvements in the Manufacture and Construction of Metal Casks or Barrels for the Conveyance of Goods and Products by sea or otherwise.*

[Sealed October 7, 1824.]

THE object of this invention is to produce casks and other vessels of iron capable of receiving food and preserving it from vermin and moisture at sea. Iron barrels have been heretofore employed for the stowage and conveyance of flour, biscuits, &c. on ship board, but if

coated within by paint, they were subject in warm climates to contaminate the flour, biscuits, or other food, with the flavour of the paint, or if not coated, they soon became destroyed by oxydation; it has also been found a source of inconvenience in the packing and unpacking of such goods in casks as would not pass through the bung hole, as the removal or replacing of the head of the cask required the assistance of a competent workman.

To obviate these inconveniences, therefore, the patentee proposes, in the first place, to coat iron barrels both within and without, with such materials as shall effectually preserve them from oxydation, and shall not communicate any unpleasant taste to the articles of food placed within even in the hottest climates; and secondly, to construct these iron barrels with such heads as shall be easily removed and replaced, and rendered air-tight at the joints; which will likewise enable articles of larger dimensions to be packed within than could conveniently be done in such barrels as only had an opening at the bung-hole.

The iron casks or barrels are to be coated both within and without, for the preservation of the vessel and what it contains, with some fibrous material, as canvas or other cloth, which is to be attached to the surface of the iron (after scaling it) by a cement such as might be made from the following ingredients:—Take of caoutchouc (Indian rubber) one pound cut into small pieces, of black resin half a pound, of Venice turpentine two ounces, and dissolve them together in a suitable spirituous liquor, under a temperature of 160° for the space of twenty-four hours at least. It is not necessary to coat the insides of barrels in this way when they are to contain dry goods, bronzing the iron in the manner of gun

barrels, will then answer, but the outsides must be completely coated as above.

When the casks are to contain chemical substances, such as tar, oil, or varnish, it may not be necessary to coat the inside; and under circumstances, it may be desirable, to attach the cloth by means of some other kind of cement, or where dry materials are to be contained, the inside coating may be attached by strong paste or glue, and the very thinnest and cheapest cloth or canvas may be employed, or even paper. It is, therefore, to be understood, that the patentee's claim of invention extends to the coating of iron barrels or casks, with a fibrous material of any kind, "from the thinnest gauze to the thickest Turkey carpet or door-mat," to be attached to the iron by any kind of cement, so as to exclude the action of the air or moisture from the iron, and thereby to prevent oxydation.

The forms of the iron casks or barrels are to be cylindrical, the joints being attached by rivets, soldering, or seaming, in the ordinary way—a hoop of iron, rolled to a rebate form, is then to be attached round the top edge, leaving a groove or recess between the thin edge of the hoop and the edge of the barrel; this groove is for the purpose of receiving a flange on the edge of the head, or cover of the barrel. The groove is to be rammed full of tow, hemp, curriers' shavings, tar bands, or any other such substance; and the goods being packed in the barrel, the head is to be put on, and its flange pressed into the packing of the groove. In order to render this head or cover moveable with perfect convenience, there are a number of latch bolts sliding sideways, on the upper side of the heads, which are to be driven into long-slots, in the top rim of the barrel; these long slots are made inclining downwards, so that, on driving the latch bolts by a hammer, the head will be drawn down tight, its flange

pressing into the packing of the groove, and the joint thereby rendered air-tight.

The reverse end of the barrel is to be secured to the sides by means of a riveted hoop, as above described, the flange of the head being pressed into a packed groove; but, instead of the latch bolts employed for securing the moveable head, the edge of the hoop is to be hammered down, and bent over the edge of the head, and by that means it is to be made fast, the joints being coated with the material, as above described, for the purpose of preventing oxydation.

[*Inrolled April*, 1825.]

To Robert Dickenson, *of Park Street, Southwark, in the County of Surry, Esq. for his improved Air Chamber, for various purposes.*

[Sealed, 1st December, 1824.]

The principal object of this invention is to prevent iron ships and boats from sinking, even though they were filled with water; and for this purpose the patentee intends to enclose buoyant vessels, such as air bags and bags filled with cork shavings, or other light substances, in cases, between the linings of the boat or ship, or in any other convenient parts of the vessel, making the said cases both air and water tight. The same kind of improved air chambers are also applicable to the constructing of sea-buoys, and for many other purposes, where buoyancy is required.

These air chambers are proposed to be made, by inserting a number of small air vessels within a larger air vessel or chamber, by which means, in the event of the larger air vessel or chamber becoming injured, the smaller air vessels will remain entire, and preserve the effect of buoyancy in the vessel or floating apparatus to which they are attached. The external vessel or chamber may be made of metal, or of any other material, rendered impervious to air and water by a coating of cloth, canvas, matting, or other such substance, saturated with paint, varnish, cement, or other preparation; the internal vessels are to be water-proof bags, or other vessels, or animal bladders, or the œsophagus of neat cattle, inflated with air, or filled with pieces of cork, or cork shavings, or cork broken almost into powder, or other light substances that will float in water. The patentee states, that it is utterly impossible to enumerate all the situations in which these improved air-chambers may be employed with advantage; he therefore mentions only a few, to which they are obviously applicable.

Buoys, which are usually air vessels when constructed of metal, may be filled with secondary air vessels upon this improved plan, for the purpose of keeping them buoyant even in the event of external injury, such metal buoys being externally coated with cloth, canvas, or other similar substance attached to the surface of the iron by means of a strong, impervious cement, so as to render the vessel perfectly air tight at the joints, and not liable to oxydation, in the same manner as he has explained in the specification of his patent, dated 7th of October last. (See our present volume, page 25.)

Cloth buoys may also be made upon this principle, by filling suitably large air and water tight vessels with air bags or bladders, or bags filled with cork, as above said;

the larger vessel being made of cloth, canvas, matting, or any other suitable substance, saturated with an impervious composition, as above mentioned; the seams of the vessel being also covered with strips of cloth attached by the same cement, and the ends of the buoys being guarded with metal caps.

Beds, bolsters, pillows, cushions, the seats of chairs, backs and seats of sofas and carriages, and also saddles for riding on horseback, may be made with these improved air chambers, instead of the ordinary packing of feathers, wool, horse hair, and other soft or elastic materials. For the latter purpose, it is proposed to employ small animal bladders, the œsophagus or wezands of neat cattle, or oil-skin bags inflated with air, crammed into air tight cases, made of any suitable material prepared with an impervious composition. Buoyant collars or bandages, to be worn by persons to prevent them from drowning, may also be made upon the principle of these improved air-chambers, which collars or bandages are to be made of wezands (œsophagus) or water-proof vessels, with pieces of cork, or crumbled cork, or cork shavings, tightly packed within, and closed at the ends.

These improved air chambers are likewise particularly applicable to boats, barges, ships, and every other kind of floating vessels, for the purpose of preventing the said vessels from sinking even though they are filled with water.

It is proposed to construct such boats, barges, ships, and other vessels, of iron, or other metal; the gunwale which extends round the vessel, is to be a hollow chamber filled with small air vessels, and externally made air-tight, by riveting the joints of the metal, and afterwards covering the metal with cloth, canvas, matting, or other suitable material. This covering is to be attached to the surface of the metal, by means of a cement or composition that shall be impervi-

ous to water and air, such as a solution of caoutchouc, rosin, and Venice turpentine, which may be laid upon the iron, and the coating of cloth, or other material, pressed upon it until it adheres, or the cement may be laid, upon the coating, or the coating may be soaked in the cement, and then made to adhere by pressing it upon the surface of the iron. The interior of this air chamber formed by the gunwale round the vessel is to be occupied with air-tight bags, made of oil-skin or other material, or bladders, or wezands as aforesaid, filled with air or with cork, which air-tight vessels are to be crammed into the chamber, so as to fill it, by which means in the event of any external injury happening to the outer air chamber, so as to rend it, the greater part of the small air vessels within will still be buoyant.

In a similar manner it is proposed to form air chambers in the lower parts of the vessel, and also in the thwarts, by filling those spaces with the secondary air vessels, and rendering them air-tight externally, by riveting the joints of the metal, and coating the whole with cloth, or other suitable substance as above said, and also in the sides of the boat or ship, between the ribs, and double plates of metal, air chambers may be constructed upon the same improved principle these chambers being filled with small air vessels as above described, or with cork shavings, by which means boats, ships, or other vessels may be made buoyant, even though filled with water.

The specification concludes by saying, "Having thus described the manner in which I adapt my improved air chamber to a variety of useful purposes, I wish it to be understood, that I do not confine myself to those purposes alone, but mean to apply them wherever such improved air chambers may be desirable, and I do not confine myself to the employment of bladders and œsophagus (wezands) alone, but intend to construct my small air vessels or bags

of oil skin, and other such materials as may be made impervious to air and water, and to enclose such small air vessels in the larger air vessel or outer case, made of metal coated with cloth, rendered impervious to air and water in the manner aforesaid, or oil-skin, or any other material that may be capable of forming an air-tight chamber. And lastly, in adapting these, my improved air chambers, to all boats, ships, and other vessels, I do not confine myself to any particular kind or magnitude of vessels, conceiving that the improved air chamber is alike applicable to the smallest boat and the largest ship, consequently I do not adapt exclusively any particular arrangement or disposition of the air chambers, but claim every mode of disposing and arranging them, that circumstances may render desirable."

[*Inrolled June*, 1825.]

Novel Inventions.

Palmer's Suspension Railway.

Amidst the multitude of projects which the present speculative age has brought to light, particularly as connected with rail roads and locomotive carriages, the public have very naturally looked with some degree of confidence to the realization of something that should at least be found practically useful; in this expectation, however, as regards locomotion, they have been hitherto disappointed, but on the subject of the former, we feel peculiar pleasure in being enabled to state from experience and observation the perfect practicability of a new kind of rail road, invented by Mr. R. H. Palmer, upon the

suspension principle, which, in our opinion, possesses advantages in the principles of its construction and in the facilities which it affords for the expeditious conveyance of passengers and goods, that we do not perceive in any other railway that has been before employed.

In our fifth volume, page 57, we have described this suspension railway, and the kind of carriage to be employed thereon, with a plate, exhibiting the details of the whole plan; it consists of a series of posts set firmly into the ground, on the top of which a wooden rail is placed, coated with a plate of iron; on this rail, two grooved wheels run, one before the other, the carriages being suspended from the axles of the wheels, and hanging down below the rail like a pair of panniers.

A railway upon this plan has just been completed at Cheshunt, in Hertfordshire, and is the first of the kind constructed for practical use. The proprietor, Mr. Gibbs, is an opulent brick-maker and builder, carrying on an extensive business upon grounds near Cheshunt, about a mile from the river Lea; and the object of this newly-constructed railway is to carry bricks from a field by the side of the great north road, to the river Lea navigation; and to bring back coals, lime, timber, &c. from the barges to the high road. The new line of railway is about three-quarters of a mile in length, commencing at the side of the river Lea navigation, and extending over marshy ground, that, in the winter time, is frequently covered with water, and would be perfectly impassable upon a railway of the old construction.

The rail is formed by deal boards, three inches thick, twelve inches wide, and from thirty to forty feet long, set up edgewise upon wooden posts, driven into the ground like piles, at about ten feet apart, their tops being cut off even and the rail fastened by pins and wedges.

On the top edge of the rail an iron bar is placed, slightly convex on its upper side, for the wheels of the carriage to run upon, the carriages being, as above said, suspended on each side of the rail by iron rods, extending from the axles. The boxes containing the goods conveyed are lifted off the carriages, at the end of the line, by a crane into the barges, for the convenience of loading, and are returned to the carriages by the same means when filled.

The plane of the road is in part upon a slight inclination toward the river, and the height of the posts from the ground, are upon an average five feet from the ground. There are some undulations in the ground; in one part near the road, a small trench is cut, for the purpose of keeping the line of rail near a lever. Some small rivulets and an arm of the river Lea, thirty-five feet wide, are crossed in the way, and here piles are driven, and the rail carried over without obstruction, there being slight bridges by the side, for the passage of the horse.

Upon this rail six carriages loaded with bricks are drawn by one horse with perfect ease, and a passing place is made near the river for one set of carriages proceeding forward, to make way for another set that are returning. This is merely a curved portion of rail set on the side of the straight rail, and the communication between the two, is made by a portion of the rail at each end of the passing place swinging like a gate, and locking into either the straight or curved line, by which means the carriages are allowed to proceed on either line without obstruction.

This new railway was publicly opened on Saturday, the 25th of June, with some degree of ceremony, and the numerous company which attended, consisting of many ladies and gentlemen of distinction, and some of the first scientific characters, expressed themselves satisfied of the

superior merit of the plan. A carriage was prepared with six seats, covered by an awning, for the purpose of gratifying such of the company as wished to ride, and the motion was found to be nearly as smooth as in sailing upon smooth water. The amount of friction has not been ascertained, but from the circumstance which occurred in the afternoon of the day, of the one horse being enabled to move at a trotting pace as he drew the carriage, with a considerable load of bricks and planks laid upon them, and about twenty persons, there is no doubt but that the friction is extremely small; we shall, however, endeavour to procure from Mr. Palmer himself, a more perfect account of this rail-road, than the shortness of the time has, upon the present occasion, enabled us to produce.

Artificial Tortoise-shell.

It appears that a French chemist has discovered, that animal gelatine can be easily obtained from bones or ivory, by treating them with weak muriatic acid, which gelatine can be afterwards turned and converted into fancy articles, having much the appearance of tortoise-shell, or rose wood.

The process of tanning gelatine is the same as that of tanning hides: after having caused it to swell by moisture, it is to be put between two layers of tan, from 10 to 15 centimetres thick, and in that state, the whole is to be placed in a tub, at the bottom of which is the necessary quantity of water to be imbibed by the tan. If the operation is not finished, after the tan is deprived of its astringent principle, it must be watered with a solution of small tan. The tanned gelatine is perfectly insoluble

and unalterable, either by water or air. The gelatine obtained from bones is semi-transparent whilst fresh, but becomes opaque on drying, and ultimately puts on the appearance of very dark rose-wood; it may be readily streaked with gold or silver. Tanned gelatine can be worked the same as tortoise-shell, and a person may turn it in the same manner as bone or ivory; but if the gelatine is tanned after it has been shaped by turning, care must be taken that it does not change its form whilst drying. I have seen (says the writer) a disc of ivory, that M. d'Arcet had treated in this manner, and upon which he had put several drops of the solution of gold; he had some toys also, which might be taken, as well as the disc, to be made of fine red shell, and upon which he set great value. Tanned gelatine will soften in boiling water with an alkali, the same as horn or shell. In this state, it takes very easy the form wished, and will mix with liquid shell. The shavings of bone and ivory may be tanned with a solution of tan (instead of powder), which is convenient and perfect for this purpose, and presents great advantage on the account of economy. M. d'Arcet hopes to obtain from gelatine, by a different process, light-coloured shell, but he has not yet succeeded. This is the only chemist that makes articles of tanned gelatine, that ever I have seen. It is to be regretted, that this branch of new and interesting industry has not yet been generally used.

M. d'Arcet has made a kind of paper by grinding animal gelatine as they do rags, and operate with it the same as they do in making ordinary paper. The material obtained, is a kind of parchment, very strong and useful.

The chemists which have established the mineral waterworks at Gros-Cailou, have begun to use gelatine in the composition for sulphureous water baths, to prevent the wa-

ter from acting on the skin, and irritating it, which the patients so much complain of. This property has long been known of gelatine, that it is not hygrometrically sensible, and of its being insoluble in cold water, which gave to M. Ginchardierre, hat-maker, at Paris, the idea of employing it in stiffening hats, and he has perfectly succeeded. The hats prepared by this substance do not become soft by the rain, a fault in all those which have been made with the Flanders or English size. The hat-makers of Paris have began to use the substance, in lieu of size.

Preparing Quills.

M. Scholz, of Vienna, has discovered a new process for rendering quills more firm and durable than those of Hamburgh: the following are the means employed. He suspends in a copper, a certain number of quills, and fills it with water so as just to touch their nibs. He then closes the copper so as to render it steam tight; here the quills experience considerable heat and moisture from the steam, by which the fat they contain is melted out. After about four hours' treatment in this manner, they attain the proper degree of softness and transparency. The next day cut the nibs, and draw out the pith, then rub them with a piece of cloth, and also expose them to a moderate heat. The following day they will have acquired the hardness of bone without being brittle, and as transparent as glass.

FROM THE AMERICAN MUSEUM.

Tide and Current Water-Wheel, for driving Mills or Machinery, with or without dams.

It consists of a simple wheel, with at least eight floats, placed in such a manner, that the water may enter the wheel on one side in a column, equal in breadth to half its diameter, with a depth of that of the length of the floats, passing out in every direction, except where it enters, acting constantly on nearly every float of the wheel to drive it round. The wheel may be constructed wholly of wood, and in the following manner;—a shaft and gudgeon as usual for a tub wheel; near the lower end of which a circular platform is fixed, made of boards or planks of the diameter of the intended wheel, say six feet. A circle is then struck off, about four feet diameter, or two thirds that of the wheel, which is divided into eight equal parts; one foot of the compasses is then set to the first division, and the other turned round, say to the left, to the periphery of the wheel, a line then drawn from one foot to the other, gives the position and surface of the lower end of the bucket. The rest are all set out in the same manner. The other ends are supported at top by a rim, resting on four or more arms, about nine or ten inches wide; a screen is placed to cover the returning side of the wheel, at an angle of about forty-five degrees, to screen that side, and direct the water into the other side, when the floats receive it on nearly parallel lines; but in attempting to pass out, it meets the floats at nearly a right angle, a part passing out by each float, and the rest pushing farther round in the wheel to the screen, or where it first entered, constantly pushing the wheel round by its gravity, as well as by its re-action in passing in and out, against the floats. A wheel of that

size with floats of six feet long, will furnish, in a current of four miles per hour, power sufficient to turn a grindstone three feet diameter, for grinding, or will do the work of from one to two men, while at work. This size need only be made of boards.

The floats should be rounded off on the back side of their edges, that they may enter and pass through the water more readily. Planks or boards should be placed by the side of the wheel to keep the water from passing by it when thrown that way by the screen. The same rule may be observed in laying out a wheel of any size, from one or three feet diameter, to those of sixteen or twenty. Wheels of twenty-four feet diameter may have twelve, and those of thirty-two feet, sixteen, all set out by the same rule: that is, let the width of the float be the same as the distance from each other on the circle, two thirds the diameter of the wheel. If the wheel is designed to be driven by the flood at ebb tide, then it will require a screen to direct the water into the wheel at flood tide, on one side, and into the other on the opposite side, as it returns, or at the ebb, thereby causing the wheel to run constantly the same way, except a short time at high and low water.

The deeper the wheel can be sunk in the water the better, when driven by the tide or current the more powerfully it will act. The slower the wheel moves the more powerful it will work, and the required velocity is acquired by gears, as usual. A convenient mode of building them, will often be by a pier wharf, extended as far as may be into the current, leaving openings, one after another, for placing in wheels, designed for any mechanical purpose. Each wheel in this way, increases the power and value of all the others. In streams where there will be danger from ice or floating timber, the

wheels require to be protected by a rack, or by having the wheel run wholly under water, at low water mark.

For a saw mill, with a head and fall of eight feet and upwards, a wheel of three feet diameter, and floats about four feet eight inches long, will be sufficient, having a space between the floats and shaft of about six or eight inches, for the water to pass. The water should be dropped or pitched into the wheel, at least as high as half way up.

For a grist mill a three feet wheel will be large enough, with the floats one foot long; when the head and fall are twelve feet or upwards, that part of the shaft which passes through the wheel, should be only about six inches diameter; above the wheel it should be large enough to support the runner, as usual. The advantages of these wheels are, that at a small expense they may be placed in any current, to drive mills or machinery, with or without a dam—present a much greater surface for the water to act upon; having also the advantage of running the same way at flood and ebb tides. May also be applied to a head and fall of water, and make a great saving in the quantity used. Are more simple in their construction, and are less obstructed by back water than any other. Have the advantage of running and working in a perpendicular as well as horizontal position, and are cheaper and easier made, and require no seasoned stuff or iron work.

Improvement in the Lime Kiln.

THIS kiln is made of either earth, brick, or stone, and formed in the following described manner:—

One end of said kiln is built of a square form, having four sides of about eight feet wide each, and ten feet in height.

At the bottom of said square part are three furnaces, or arches, with divisions between them, similar to those in the arches of a brick kiln; these arches extend in depth the same as that of the square part before mentioned, the part over the arches is then filled up, and made level to form the floor of said square part; in the centre of one of the four sides of said square part, there is a door, either at the height of the floor, or higher up.

From one, two, or all the four sides of said square part projects an arch, or vault, of a semi-circular form, and about six feet in height: said arch or vault extends out about 26 feet, and is formed bevelling towards the extreme end.

At the bottom of the end of said vault there are three furnaces, or arches, in every respect similar to the arches in the square part before described: over each of said arches, at the height of the level floor there are three openings for the purpose of introducing the wood to supply the fire at the back part of the arch or vault.

The lime is taken in from the door in the square part, and laid on the floor of the arch or vault, which is on a level with the bottom of the furnaces or arches before mentioned, the lime-stone is so placed as to form a continuation of the arches at the ends of the kiln. The upper part of the vault or arch is then filled in a compact manner, leaving a vacuum or space between the wall of the narrow end of the vault, and the lime-stone; which vacuum contains the fire that is made on the level part over the under arches.

When the lime-stone is all stowed, the mouth or opening in the widest end of the vault or vaults is then bricked up with loose bricks, the arches filled with wood, and fire set to it, and let burn until the stone is turned to lime.

To convert Iron into Steel.

It is well known to all persons conversant with the art of converting iron into steel, that the pulverized charcoal or carbon together, with whatever other substance they may mix with it, if any, is laid into the furnace in layers, between each layer or strata of iron. 1st. To make one side of common flat bars of iron into steel but half through each bar. Let there be first a layer of carbon in the common way, then a layer of bars of iron, then a layer of clay, or mixture of clay, that will not melt with the necessary heat to be applied, or any other substance not containing carbon sufficient to convert iron into steel, or that has a tendency to damage the purity of iron. The next layer of iron to be laid upon this clay or other substance, and then again carbon, and so through the batch alternately, a layer of carbon, and a layer of other substance between the layers of iron. Being thus laid and heated a sufficient length of time, and to a proper degree of heat to convert the bars of iron thoroughly into steel, when laid in the common way, will of course leave these bars half iron.

If it be wished to make the bars more than half steel, it will be seen at once that it must be kept hot a suitable time longer; and if less, then half a suitable time shorter. If one edge of flat bars are to be converted to steel, the same principle is to be followed, by setting the bars edgewise in the furnace, and letting the carbon come in contact with the iron on both sides of the bar; as far as it is wished it may be converted to steel, applying the clay or other substance to the part to be left iron; and in whatever shape the iron may be it is immaterial, so that the carbon come in contact with the part to be made into steel, and not elsewhere.

This operation may also be performed without any clay, or any other substance being applied to the parts to be left iron. The application of clay, &c. is much preferable, as by it there is a more complete command over the parts not to be converted into steel.

Polytechnic and Scientific Intelligence.

ROYAL SOCIETY.

April 14, 21, and 28, were occupied in the reading of a paper by Dr. Granville, giving the description of an Egyptian mummy, purchased at Gornou by Sir Archibald Edmonston, in 1819. It was enclosed in a single case, supposed to be of sycamore wood about two inches thick, consisting of two parts fastened together with wooden pins, and covered internally with plaster of considerable thickness painted with hieroglyphical characters, apparently forming one entire composition, but which has not yet been deciphered.

The body was covered with cere-cloth and bandages arranged in the most skilful manner, and so as effectually to prevent all communication with the external air, and so great in quantity, that when taken off they were found to weigh 28lbs. avoirdupoise.

The rollers were made of an elastic but compact sort of linen, four or five yards in length, without a stitch or seam in any part of them.

The body was that of a female—the head had been shaved—the teeth were in a sound condition—the arms laid across the breast—among the linen bandages were found a few blue and green coloured glass beads, and bugles similar in every respect to those used by the ladies of the present day. The general surface of the body is of a dark brown colour nearly black. The entire length from the crown of the head to the soles of the feet, five feet one inch. The proportion of the limbs to each other, almost exactly those

of the Venus de Medicis, as given by Winckelman. The form and dimensions of the pelvis are remarkably perfect, and that of the head completely European.

On opening the body the principal viscera were found entire, the bowels only having been extracted through the anus. The brain had also been removed apparently through the nostrils.

From a minute examination of the body, and an analysis of the substances found in it, Dr. Granville conjectures the following to have been the method employed in the preparation of it.

He supposes that after disembowelling and extracting the brain, it was covered with quick lime for a few hours, and then scraped with a blunt knife in order to remove the cuticle; that the body was then immured in a liquid mixture of wax and resin, in which it was suffered to remain over a gentle fire for a certain number of days, till the liquid mixture had penetrated every part, and this he considers to have been the most essential part of the process.

The next steps were to subject it to the process of tanning, and immersion in the concentrated water of the natron lakes so abundant in the neighbourhood of that country; it was then allowed to dry for a few hours, and afterwards swathed with bandages of cotton linen, properly prepared with a solution of tanning.

Such Dr. Granville supposes to have been the processes employed by the ancient Egyptians, and in confirmation of that opinion, he produced several recent subjects prepared by himself, and which in appearance very closely resemble the mummies of the ancients.

May 5.—A paper on the temporary magnetic effect induced in iron bodies by rotation, by Mr. Philip Barlow, was read.

May 12. On the alteration which takes place in the

magnetism of an iron plate from rotation on its axis, by S. H. Christie, esq.

As these two papers, another by the latter gentleman, and one by Messrs. Babbage and Herschel, since read to the Society, all relate to the same subject, we shall reserve an account of them to a future number, when we will endeavour to give a clear and comprehensive view of the interesting discoveries lately made by Mr. Arago, in magnetism.

May 19.—A paper from Professor Woodhouse was read, giving an account of the Transit instrument lately put up in the observatory at Cambridge.

Granchester Church being nearly in the meridian of the observatory, it was desirable to place the instrument so as to be able to fix the mark on the steeple. After describing the methods employed for this purpose, and pointing out their several advantages and disadvantages, Mr. Woodhouse notices an occasional deviation observed in the instrument, which after causing some perplexity, was found to originate in the expansion of the lateral braces intended to secure the perpendicularity of the axis of the telescope, to the axis of the instrument. It was occasioned by the heat of the assistant's body; proper means were immediately taken to prevent a recurrence of these aberrations.

A paper by Thomas Weaver, esq. containing a description of the Fossil Elk of Ireland was also read.

The gigantic bones of this animal so frequently found in Ireland, and its total disappearance, has led many to attribute its extinction to the general deluge. The author of this paper, however, supposes it to have arisen from continued persecution—from the skeletons always being found in swampy situations—from the wounds and marks of disease exhibited by many of the bones, and from their generally appearing to contain all the principles found in fresh bones.

ASTRONOMICAL SOCIETY OF LONDON.

MAY 13.—The reading of Mr. Henry Atkinson's elaborate communication on the subject of Refraction was concluded. In the course of this paper the author has collected and arranged a great variety of meteorological observations, made in different seasons, and at different parts of the world, for the purpose of enabling him to ascertain the mean temperature at the equator and in different latitudes, as well as the law of variation in the temperature of the air at different heights above the level of the sea. From these data he has deduced formulæ, by the use of which the *computed* and *observed* mean temperatures in any given place, or at any given height, appear to agree in a remarkable manner. His next inquiry is, to ascertain the law by which the *height* and the *elasticity* of the air is connected; and also the relation between the *elasticity* and *density* at any given height. These inquiries are guided by observations and experiments that have been made and published by men of eminence in this department of science. The reasoning and deductions are founded on acknowledged facts; and hypothesis furnishes no part of the data from which the *tables*, founded on these investigations, are computed. *Astronomical* observations supply no portion of the materials which form the basis of the computations, but all the results are obtained by formulæ depending on *optical principles;* so that the near agreement of the quantities contained in these tables (when properly collected) with those given by the most approved modern tables of refraction, proves that the various formulæ by which these quantities were obtained are founded in nature, as well as happily applied. The atmosphere is divided into a variety of strata, and each stratum has its appropriate

formula for determining its share of mean refraction; and when the different portions belonging to the different strata are put together in succession, they constitute such an arrangement of quantities as proceed by a regular gradation, or very nearly so; and nothing but a close examination of the differences can detect that the whole succession has not depended on one continued formula. Besides the atmospheric refractions adapted as corrections for celestial observations, the author has applied one of his formulæ successfully to determine the terrestrial refraction, as it has reference to two objects standing in different elevations: so that whether this memoir be considered as a metereological, geodetical, or astronomical communication, it cannot but be regarded as copious, elaborate, and interesting.

There was also laid before the meeting an account of observations made at Paramatta, in New South Wales, by Major-General Sir Thomas Brisbane, K.C.B. Governor, &c.; communicated in a letter to Francis Baily, Esq. President of this Society. These refer to the solar eclipse on January 1, 1824; to several occultations of fixed stars by the Moon; to stars observed with the Moon near her parallel; to observations before and after the superior conjunction of Venus with the Sun, July and August, 1824; to observations on the planet *Uranus* near the opposition in July, 1824; and to observations on two comets, one of which was not observed in Europe.

Next there was read a report on the properties and powers of an altitude and azimuth circle constructed by Edward Troughton, and divided by T. Jones; drawn up by the Rev. W. Pearson, L.L.D. F.R.S. and Treasurer to this Society. The peculiarities of the construction of this fine instrument cannot be adequately described in an

abstract. But some estimate may be observed of its accuracy from stating, that by comparing the *mean* latitude of South Kilworth Rectory (Leicestershire) with each and all of *sixteen* separate determinations, it does not differ more than one-second and one-tenth from the extreme latitude; that the true obliquity of the ecliptic at December solstice, 1824, as determined by this instrument, was 23° 27′ 44″, 01; while the mean of the determinations of Delambre, Brinkley, and Bessel is 23° 27′ 44″, 55. Observations on the pole-star, and another determination of the obliquity of the ecliptic, by a method suggested by Dr. Brinkley, serve still further to confirm the character of the instrument for accuracy, and the value of such an instrument, when used by a skilful, scientific, and experienced observer.

The reading was commenced of a paper on the construction and use of some new tables, for determining the apparent place of about 3000 principal stars; drawn up at the request of the council, by the president.

June 10.—The reading of Mr. F. Baily's introduction to the new tables for determining the apparent places of 3000 fixed stars, was resumed and completed. This copious introduction commences with an historic sketch of the most important tables which have hitherto been published for similar purposes; none of which, however, are so extensive as the tables to which the present paper is introductory. They comprehend, first, all stars above the *fifth* magnitude, wherever situated; secondly, all the stars, not less than the *sixth* magnitude, situated within 30° of the *equator;* thirdly, all the stars, not less than the *seventh* magnitude, situated within 10° of the *ecliptic.*

After a few general observations, Mr. Baily speaks in succession of the distinct topics of *aberration*, *annual precession*, and *nutation;* exhibiting the analytical for-

mulæ which have been proposed for the computation of their respective values at any time, past, present, or future; assigning the reasons for the adoption of those values of the *constants* which he has preferred; and so transforming the several formulæ, as to facilitate and effect their reduction into one class of comparative simplicity, which forms the basis of the tables themselves. Thus the total corrections for right ascension and declination assume the forms

$$\Delta\,\alpha = \text{A}\,a + \text{B}\,b + \text{C}\,c + \text{D}\,d$$
$$\Delta\,\delta = \text{A}\,a' + \text{B}\,b' + \text{C}\,c' + \text{D}\,d'$$

where the quantities denoted by a, b, c, d, and the accentuated a', b', c', d', are *constant* for each star, while the quantities A, B, C, D, are common to every star. The quantities A, B, are rendered equally constant for all the stars, by the assumption of a fictitious year, commencing at that moment when the Sun's *mean* longitude at Greenwich at *mean* noon on Jan. 1, is 281°; which is, therefore, assumed as the *tabular date*, and the mode of adopting it to the current date is explained.

The author then explains the arrangement and use of the tables. The general catalogue of the stars is arranged in the order of the right ascensions, and reduced to Jan. 1, 1830. The left hand page is confined to the *right ascensions*, the right hand page to the *declinations*. Col. 1, on the left hand, exhibits the *numbers* of the stars. Col. 2, the *names*; to which are prefixed, Flamstead's numbers, and the letters of the alphabet, by which they are usually distinguished. Col. 3, denotes the *magnitudes* of the stars. Col. 4, AR *in time*, for Jan 1, 1830. Col. 5, the annual precession *in time*. The remaining columns contain the logs. of a, b, c, d, each previously divided by 15 to reduce them to time.

On the right hand page, Col. 1 is the same as Col. 1 on

the left hand. Col. 2, exhibits the *declinations* of the stars, Jan. 1, 1830. Col. 3, *annual precession.* Cols. 4, 5, 6, 7, the values of a', b', c', d'. Then there are two columns headed B and P, denoting the corresponding numbers in the catalogues of Bessel and Piazzi respectively; while the last column is reserved for those which are to be found in Hevelius, Lacaille, Mayer, Zach, &c.

There are several subsidiary tables which Mr. Baily also succinctly explains; and he further developes the principles of correction for *proper motion*, &c. when necessary.

The general rule for the use of the tables is this; viz. Take out from the general catalogue, and opposite the given star, the logarithms of a, b, c, d, and a', b', c', d', with their proper signs; and from the subsidiary Tables I. and II. opposite the given day, the logs. of A, B, C, D, with their proper signs; which must be written down under the preceding logarithms; then add each pair A, a, B, b, &c., together; and take out respectively the natural numbers, corresponding to the sum of the two logarithms; and observing that the signs only affect the resulting natural numbers, incorporate them by addition or subtraction accordingly; the amount will be the total correction required; that arising from a, b, c, d, being the correction in AR; that from a', b', c', d', the correction in declination.

The tables are arranged to *mean solar* time, which, it is presumed, will extend their utility. And it may be observed, that by way of *artificial memory*, to facilitate the recollection of the precise subject to which each column refers (as in B for Bessel, P for Piazza, already mentioned), Mr. Baily has made A B represent the quantity by which the A B *erration* is determined, C the quantity by which the *pre* C *ession* is determined, and D

that by which the D *eviation* or *Nutation* is determined. These contrivances, though avowedly subordinate, will not be despised by those who know how much the pursuits of science are at all times promoted by the introduction of a happy technical mnémonics.

After the reading of this elaborate and interesting paper, the Society adjourned their sittings until Friday the 11th of November next.

Royal Academy of Sciences, Paris.

M. Humboldt presented to the academy a fragment of a mass of meteoric iron which was found in Columbia, at a short distance from Santa Fé de Bogota, near the summit of a mountain. The entire mass weighed 3300 pounds, and required great labour to remove it to the forge of a smith, who bought it for about five pounds, and who began by smelting a part of it with the intention of employing it for the uses of his trade. Having, however, found it too brittle for his purpose, he gave up the idea of working it, and even concealed the remainder of it, through a fear lest his credit should be injured if it were known he employed such an inferior article. Fortunately, an eminent naturalist, M. Humboldt's correspondent, having accidentally learnt the secret, obtained the mass of iron and analysed a part of it. The result of this analysis, by proving the existence of a certain quantity of nickel mingled with the ore, has put the aërial origin of this mass beyond a doubt. The aërolite of which M. Humboldt has presented a fragment to the academy, is one of the most curious mentioned in the history of *science*.

New Patents Sealed, 1824.

To William Henry James, of Cobourg-place, Winson Green, near Birmingham, engineer, for his invention of certain improvements in apparatus for diving under water, and which apparatus, or part of which apparatus, are also applicable to other purposes—Sealed 31st May–6 months.

To John Harvey Sadler, of Hoxton, in the county of Middlesex, mechanist, for his invention of an improved power loom for the weaving of silk, cotton, linen, wool, flax, and hemp, and mixtures thereof—31st May—6 months.

To Joseph Frederick Ledsam, merchant, and Benjamin Cook, brass founder, both of Birmingham, for their invention of improvements in the production and purification of coal gas—31st May—6 months.

To Joseph Crowder, of New Badford, in the county of Nottingham, lace net manufacturer, for his invention of certain improvements on the pusher bobbin net machine —31st May—6 months.

To Joseph Apsden, of Leeds, in the county of York, bricklayer, for his new invented method of making lime —6th June—6 months.

To Charles Powell, of Rochfield, in the county of Monmouth, gentleman, for his having invented and brought to perfection an improved blowing machine—6th June—6 months.

To Alfred Bernon, of Leicester-square, in the county of Middlesex, merchant, in consequence of a communication made to him by a certain foreigner residing abroad for certain improvements in fulling mills, or machinery for fulling and washing woollen cloths, or such other fabrics as may require the process of fulling—7th June—6 months.

To Moses Poole, of the patent office, Lincoln's Inn, in the county of Middlesex, gentleman, in consequence of a communication made to him by a certain foreigner residing abroad, for an invention for the preparation of certain substances for making candles, including a wick peculiarly constructed for that purpose—9th June—6 months.

To John Burridge, of Nelson-square, Blackfriars Road, in the county of Surrey, merchant, for his invention of ertain improvements in brick houses, or other materials, for the better ventilation of houses and other buildings--9th June—6 months.

To John Lindsay, of the island of Henue, near Guernsey, Esq. for his invention of certain improvements in the construction of horse and carriage ways, of streets, turnpike and other roads, and an improvement or addition to wheels to be used thereon.—14th June—6 months.

To William Henry James, of Cobourg-place, Winson Green, near Birmingham, in the county of Warwick, engineer, for his invention of certain improvements in the construction of steam boilers, for steam engines—14 June—6 months.

To Jonathan Downton, of Blackwall, in the county of Middlesex, shipwright, for his invention of certain improvements in water closets—18 June—6 months.

To William Mason, of Castle-street, East Oxford-street, in the parish of Mary-le-bone, in the county of Middlesex, axletree manufacturer, for his invention of certain improvements on axletrees—18 June—6 months.

To Charles Phillips, of Upnor, in the parish of Findsbury, in the county of Kent, Esq. for his invention of an improvement, or certain improvements in the construction of a ship's compass—18 June—6 months.

To George Atkins, of Drury Lane, in the parish of St. Clement's Danes, and county of Middlesex, gentleman, and

Henry Marriott, of Fleet-street, in the city of London, ironmonger, for their invention of certain improvements on, and additions to, stoves or grates—18 June—6 months.

To Edward Jordan, of the city of Norwich, engineer, for his having discovered a new mode of obtaining power, applicable to machinery of different descriptions—18 June—6 months.

To John Thompson, of Vincent-square, Westminster, and the London Steel Works, Thames Bank, Chelsea, and John Barr, of Halesowen, near Birmingham, engineer, for their having invented and brought to perfection, certain improvements in producing steam, applicable to steam engines or other purposes—21 June—6 months.

To Thomas Worthington, the younger, and John Mulliner, both of Manchester, in the county of Lancaster, small ware manufacturers, for their invention of, and improvements in the loom, or machine used for the purpose of weaving or manufacturing of tape, and such other articles to which the said looms or machines may be applicable—21 June—6 months.

To Ross Corbett, of Glasgow, in Scotland, merchant, for his invention of a new step or steps, to ascend and descend from coaches and other carriages—21 June—6 months.

To Phillip Brooks of Shelton, in the Potteries, Staffordshire, engraver, for his invention of, and improvement in a certain composition, and the application thereof to the making of dies, moulds or matrices, and various other useful articles—21 June—6 months.

To John Frederick Smith, of Dunstan Hall, Chesterfield, in the county of Derby, Esq. for his invention of certain improvements in machinery for drawing, roving, spinning, and doubling cotton, wool, and other fibrous substances—21 June—6 months.

D.	H.	M.	S.	
1	15	0	0	☿ in conj. with ♂ long 29° in Gemin ☿ lat. 18′ N. ♂ lat. 39′ N. diff. lat. 21′.
1	17	0	0	☾ in conj. with β in Cap.
7	19	24	0	☾ in □ last quarter.
8	12	0	0	☾ in conj. with η in Pisces.
10	13	0	0	☾ in conj. with δ in Aries.
10	18	0	0	♀ in conj. with δ in Taurus.
11	3	0	0	♀ in conj. with 2δ in Taurus.
11	13	0	0	☾ in conj. with A in Taurus.
11	22	0	0	☾ in conj. with 2η in Tau.
12	12	0	0	♀ in conj. with ι in Taurus.
12	18	0	0	☾ in conj. with ♄ long. 16° in Gemini ☾ lat. 23′ N. ♄ lat. 1.27 S. diff. lat. 1° 50′.
13	20	0	0	☾ in conj. with η in Gem.
13	23	0	0	☾ in conj. with μ in Gemini.
14	16	0	0	☾ in conj with ζ in Gem.
14	17	0	0	♀ in conj. with α in Tau.
15	10	15	0	Ecliptic Conjunction or ● New Moon.
16	17	0	0	☽ in conj. with 2α in Cancer.
17	11	0	0	☽ in conj. with ο in Leo.
17	20	0	0	☽ in conj. with π in Leo.
21	16	0	0	☽ in conj. with i in Virgo.
22	3	34	0	☽ in □ first quarter.
22	17	3	0	☉ enters Leo.
24	9	0	0	☽ in conj with δ in Scorpio.
25	14	0	9	♂ in conj. with δ in Gem.
25	19	0	0	☿ in conj. with ♃ long. 18° in Leo ☿ lat. 1° 29′. N. ♃ lat. 47′ N. diff. lat. 42′.
25	20	0	0	☽ in conj. with B in Oph.
26	10	0	0	♀ in conj. with ♄ long. 17° in Gemini ♀ lat. 3°. 36′ S. ♄ lat. 1°. 27′ S. diff. lat. 2°. 9′.
27	13	0	0	☽ in conj. with ο in Sag.
27	16	0	0	☽ in conj. with π in Sag.
27	19	0	0	☽ in conj. with d in Sag.
29	9	57	0	Ecliptic opposition or ○ full moon.
30	12	0	0	☿ in conj. with α in Leo.
31	1	0	0	♀ in conj with ζ in Taurus.

The waxing moon ☽ — the waning moon ☾

Rotherhithe. J. LEWTHWAITE.

METEOROLOGICAL JOURNAL, MAY AND JUNE, 1825.

1825.	Thermo.		Barometer.		Rain in inches.	1825.	Thermo.		Barometer.		Rain in inches.
	Higt.	Low.	+	—			Higt.	Low.	+	—	
MAY.						JUNE.					
26	64	43	29,66	59,59		11					
27	53	43	—,73	—,67		12					
28	56	35,5	—,82	—,80		13					
29	53	34	—,89	—,80	,375	14					
30	61	37	30,08	—,92		15					
31	64	34	—,27	30,20		16					
JUNE.						17					
1	69	32	—,29	—,22		18					
2	64	48	—,04	29,83		19					
3	67	50	29,70	—,66		20					
4	58	47	—,56	,23	,3	21					
5	58	42	—,70	—,39		22					
6	69	47	—,92	—,90		23					
7	72	49	—,87	—,82		24					
8	71	47	—,92	—,90		25					
9						26					
10											

CHARLES H. ADAMS, LOWER EDMONTON.

LITERARY NOTICES.

NUMBER V. of the graphic work, entitled Gems of Art, has made its appearance, containing five plates, from the paintings of ancient and modern masters, viz. the "Fortune Teller," of Sir J. Reynolds; "Boats in a light Breeze," by Vander Capella; the "Laughing Boy," by Murillo; "Dutch Boors," by Teniers; the "Rialto," after Canaletti; having spoke of the excellence of a former number of this work, we need only say, the artists are Messrs. Bromley, Ward, and Lupton, whose able efforts have so often been the theme of admiration.

Rare MSS. in the Library of the Abbé Gottureg, in Austria.— Among the valuable MSS. in this library, are the following:— 1. Ciceronis Cato major; a MS. of the 12th century, on parchment, in 12mo. marked K 43; 2. Ciceronis Lælius, paradoxa, somnium Scipionis; 3. Priscianus grammaticus, making with the preceding a volume, quarto MSS. of the 14th century, on parchment; 4. Senecæ Proverbia, in 4to. parchment, d 17; 5. Valerii Martialis Epigrammatica f. 19; 6. Quintilianus de Officis discipulorum ex Præcepto, in folio.

The Pepysian Diary and Correspondence, edited by Lord Braybrooke, is expected with much impatience. The Dairy commences before the restoration, when Mr. Pepys sailed with the earl of Sandwich to bring over the King from Breda, and is continued almost without interruption for ten years. It is said, that independent of the political transactions of the period, the pages abound with private anecdotes of King Charles II. and his court.

In a few days will be ready, by James B. Fraser, Esq., author of a Tour in the Hymalaya Mountains, a narrative of a journey into Khorasan; including some account of the countries to the north-east of Persia, with remarks upon the national character, government, and resources of that kingdom; the work will contain a map of the country.

LEIPSIC.—A Society has just been established at Leipsic, for the purpose of exploring and preserving national antiquities; every object of Art, from the most ancient times down to the thirty years' war will be sought for with the greatest care. They will be accurately described: and all manuscripts that are capable of being published will be included.

EXPEDITION.—Captain Beechey has sailed in the Blossom, for the Pacific. His instructions are, to visit and lay down precisely the situation of Pitcairn, Otaheite, Easter and Friendly Islands, &c. and then to proceed to Behring's Straits, when his operations are to be connected with the operations of Parry and Franklin.

Mr. D. C. Hill, author of the sketches in Perthshire, is commencing a work to be published in numbers, in the northern capital, entitled Forty Views on the Clyde and its tributary streams.

ROME.—Pope Leo XII. has greatly increased the library of the Vatican, by the purchase of that of the Chevalier Cicoguara; he has likewise augmented the Museum of Antiquities of the Vatican, with various beautiful and interesting statues. The Museum is, besides, about to be enriched by the superb collection of Vejenti and that of the late Duchess de Chablois.

Near the road of Monticelli, two mosaic tablets in white and black marble, have been recently discovered; they are supposed to have been part of the celebrated villa of Zenobia.

ASTRONOMICAL INSTRUMENTS, &c.—It has long been a desideratum with the philosophical world to possess a purer medium, through which to make astronomical and nautical experiments, than the glass at present manufactured for those purposes; and it is with considerable pleasure we learn, that the Royal Society and Board of Longitude, under the direction of Sir H. Davy, the president of the former, have zealously undertaken the accomplishment of so desirable an object, and a series of experiments have now commenced under the superintendance of Mr. Hudson.

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No. LVII.

Recent Patents.

To THOMAS PARKIN, *of Baches-row, City Road, in the County of Middlesex, Merchant, for his Invention of certain Improvements in Machinery, or Apparatus, applicable to, or employed in Printing.*

[Sealed 15th May, 1824.]

THIS machine is designed for letter-press printing, having one form of types placed on a traversing table, with a pressing cylinder in the middle, and the sheets of paper to be printed are alternately conducted by means of nipping rollers and an endless blanket from tympans on each side of the pressing cylinder: whence after passing over the form of types, and receiving the impression, they are carried up between endless tapes, and are discharged from the machine on to wooden tables above.

The operations of this machine are but slightly varied from several other printing machines that have preceded it, but the mechanical construction differs considerably in several parts.

Plate III. fig. 1, is a section of the machine taken length-wise, which consists of a strong iron frame supporting the whole of the mechanism; *a*, is the pressing cylinder, turning on pivots in bearings on the side of the frame, with adjustments to accommodate it to any desired pressure: *b*, is the form of types placed upon the table, *c*, *c*, which table traverses to and fro upon anti-friction rollers running on the sides of the frame. The parts are all actuated by means of a winch affixed to the axle of a fly-wheel, *e*, which is mounted upon a standard on the outside of the frame of the machine, and gives motion to the mechanism in the following manner.

On the axle of the fly-wheel, there is a pinion that takes into a toothed wheel, *f*; this toothed wheel carries round a crank upon its axle, and the rod, *g*, connected to the crank and to the swinging lever, *h*, causes that lever to vibrate. The lower end of the swinging lever has a rack, formed of a segment of a circle, which rack takes into a toothed wheel below, on the same axle as the wheel, *i*; thus as the toothed wheel *f*, and its crank goes round, and by means of the rod *g*, actuates the swinging lever, the curved rack at bottom causes the axle and the wheel, *i*, to turn alternately to the right or to the left, and the teeth of the wheel *i*, taking into a straight rack, *k*, *k*, which is attached to the under side of the table, *c*, *c*, drives the table with the form of types to and fro, under the printing cylinder.

On the side of the table there is a straight rack, *l*, *l*, which takes into a toothed wheel at the end of the

cylinder, *a*, and there is another rack on the under side of the sliding bar, *m*, which also takes into the teeth of the wheel at the end of the cylinder, *a*; the three racks, *k*, *l*, and *m*, being parallel to each other. The inking rollers, *n*, *n*, are suspended by hooks at the end of the sliding bar, *m*, and as the bar moves backward and forward, they take the ink from the inking tables, *o*, *o*, and deposit it upon the face of the types, *b*. The ink is supplied to the tables, *o*, *o*, by rollers, *p*, *p*, which traverse across at the ends of the machine, and are actuated in the following manner.

On the axle of the wheel *i*, there is a bevelled toothed wheel, which turns two other bevelled toothed wheels on the shafts *g*, *g*, and by the alternating movement of the wheel *i*, before described, these shafts are also made to turn alternately to the right and left, and by means of band wheels, *r*, *r*, on those shafts, the rollers, *p*, *p*, are drawn to and fro across the ends of the tables, *o*, *o*, bringing supplies of ink from ductors, at the ends of their race, on the sides of the machine. The ink thus deposited upon the tables, *o*, *o*, is spread over the tables, and taken up by the inking rollers, *n*, *n*, when by the sliding of the bar, *m*, those rollers are brought on to the tables.

Let it now be supposed that by the vibration of the swinging lever, *h*, the racks, *k* and *l*, with the table, *c*, and form of types, *b*, have been brought to the left hand of the printing cylinder, *a*, the upper rack and the bar, *m*, will by the same operation have been conducted to the right hand; this may be called the position of the machine ready for starting. A sheet of paper to be printed, is now laid upon the left hand tympan, *s*, its situation being carefully adjusted by registering points, and the machine being put in action, the racks, *k* and *l*, with the

table, *c*, and form of types, *b*, now slide along the machine to the right hand, passing under the left hand inking roller, *n*, as that and its bar, *m*, moves towards the left hand end of the machine, thereby furnishing the types with ink, which is more uniformly spread upon the types by another roller near the printing cylinder.

At each extremity of the bar, *m*, there is a cross rail, connecting it to a corresponding bar on the other side of the machine, and as the bar slides back to the left, this cross rail strikes against the tail of a small hanging lever, *t*, on the side of the frame, which pulls a cord that draws the tympan forward a short distance, and places the edge of the paper between what is called the nipping rollers, *v*; at this moment the registering points of the tympan sink by a small roller upon a bar, which supports them running down an inclined plane on the side of the frame, and the advance of the tympan having drawn up a cord with a suspended weight *u*, the friction of that cord upon a small pulley has raised the lever, *w*, which allows a roller, *x*, supported by a cord from that lever, to slide down a groove in its standard and rest on the sheet of paper, so as to prevent its moving from the adjusted position.

The nipping rollers, *v*, actuated by cords connected to the ends of the bar, *m*, now take hold of the sheet of paper, and conduct it to the endless blanket, which passes under the pressing cylinder, *a*, where the farther progress to the right of the table, *c*, and its rack, *l*, with the form of types, *b*, causes the printing cylinder, *a*, to draw the sheet on to the form, and to give it the impression as the table and types pass under. A small guide, *y*, is placed on the side of the triangular standard in the middle of the machine, for the purpose of conducting the sheet of paper, after it has been printed, to the taking off tapes.

These tapes are made to run over their pullies by means of cords from the wheel, *x*, at top, which is actuated by a band from a wheel on the axle of the fly-wheel. Thus each sheet of paper, after printing, is conducted to the taking off tapes, and is by them carried up, and ultimately deposited upon the table at top of the machine, from whence it is removed by hand, and placed on the heap.

Having explained the operation of the machine, in conducting and giving the impression to a single sheet of paper from one end, it is only necessary to say, that the sheets are to be placed both on the right and left hand tympans, in the same way as already described, and that they are delivered alternately on to the tables above after being printed from one form; and that all the parts, and the operations of the parts of the machine, are alike at both ends from the centre: excepting that distinct machinery placed on the side for giving motion to the whole. The machine may therefore be considered as a double acting printing press, but is not constructed to *perfect*, that is to print the sheet on both sides by the same operation. When therefore all the sheets of paper have been printed on one side, they are again placed in two heaps, and drawn off singly, by hand, on to the tympans, the blank side of the sheet being downwards, where their positions are carefully adjusted to the registering points; and by passing under the printing cylinder, by the same means as above explained, the sheet is perfected, that is, the impression is given on both sides.

[*Inrolled, September* 1824.]

To JOHN THEODORE PAUL, *late of Geneva, but now residing at Charing Cross, Westminster, in the County of Middlesex, Mechanist, in consequence of a communication made to him by a certain Foreigner, residing abroad, for certain Improvements in the Method or Methods of generating Steam, and in the Application of it to various useful purposes.*

[Sealed May 13, 1824.]

THIS invention is a mode of generating steam of high pressure, by passing water through a long contorted pipe enclosed within a furnace; by which contrivance a greatly extended surface is exposed to the action of heat, and steam of very high pressure produced with great rapidity.

It is proposed to place a long metal pipe of small diameter round the furnace, and to force or inject water into one end of it, by means of a pump: which water is to be allowed to escape at the other end of the pipe, in the form of high pressure steam. The requisite length, capacity, and strength of the pipe, of which the boiler is to be formed, will depend upon the engine it is intended to work. For an engine of two horse power, the pipe should be one hundred and fifty feet long, having its internal diameter at least three sixteenths of an inch, and if of copper, about one sixteenth of an inch thick. This pipe is to be heated throughout its whole length nearly to redness, when the water injected at one end will escape at the other end in the state of steam, equal in pressure to about one hundred and fifty pounds upon the inch.

In constructing a boiler upon this principle, it is proposed to make a conical vessel of sheet iron, as an external casing, the broad end of the frustrum downwards; round the inside of this vessel, the pipe above described, is to be coiled, and supported up flanges. A portion of the pipe, at the lower part of the vessel, is to be bent, so as to form the grate bars, upon which the fuel for heating the boiler is to be deposited, and the fuel may be introduced from the chimney at top, or otherwise, as may be found most convenient. A reservoir of water must be placed contiguous, and a forcing pump for injecting it into the pipe; and it is proposed to coat or cover the outer case with brick dust or coal ashes in order to prevent the radiation of heat.

The fuel being ignited, as in ordinary furnaces, the forcing pump is put in operation, which injects the water at the lower extremity of the pipe, so that as it rises through the conical worm, or contorted pipe, the water may become more and more heated, until it expands into steam, and this steam as it passes through the upper part of the coil, continuing to receive additional heat, ultimately escapes at the end of the pipe with great elastic force, in which state it proceeds to the engine.

For constructing the boiler of a steam carriage, where a chimney cannot be conveniently employed, another disposition of the worm pipe is proposed. In this boiler, the pipe is to be coiled in the form of two frustrums of cones, of different dimensions, placed concentric; the larger or outer cone having its wider part at top, and the smaller, or inner one, its wider part at bottom. The continuous coil of pipe, thus formed into two cones, is to be fixed firmly upon suitable supports within the casing, which must be double, and the space between filled with coal ashes, or brick dust, or any other imperfect con-

ductor of heat, as in the former instance. The fire is made at the lower part in contact with the pipes, and the bottom of the casing is to be formed into a funnel shape, for the purpose of receiving the cinders and dust which fall from the fire, and conducting them to an ash pit below. In this funnel an aperture is made, and a pipe inserted, which conducts a gentle current of air to the furnace, in order to keep up the fire, and consume the smoke; the current of air may be produced by bellows or by a wind hole, as may be found most desirable: and the fuel may be supplied from an air-tight box above, or by any other suitable means. The injecting pump is to be applied to one end of the pipe as before described, and the high pressure steam allowed to escape at the other end, for the purpose of working the engine. The carbonic acid, or other vapour, which is not destroyed by passing through the fire, is allowed to descend through the passage to the ash pit, and to escape into the open air.

The specification concludes by saying, that for supplying engines of greater power than those above contemplated, more than one pipe boiler may be employed, and these may be heated either in the same way as above described, or in separate furnaces; they may be heated either by immediate contact with the ignited fuel, by the radiant heat from it, by the flame emitted, by the burning of gas, by heated air, or by any other fit and convenient means. The size, shape, or construction of the furnace, may also be varied considerably, according to circumstances, as may likewise be the arrangement of the coils of pipe, provided that the boiler consists of one entire or continuous pipe, or several pipes united together, so as to form one continuous passage from the end where the water is injected, to that where the high pressure

steam rushes out. The pipes may be made of any other suitable material besides copper, but their substance must be varied accordingly. The exterior surface of the pipe may be coated with a layer of fire clay, or any other fit material, to guard the pipe against the effects of the fire, and to prevent oxydation.

[*Inrolled, November*, 1824.]

To ARCHIBALD BUCHANAN, *of Calme Cotton Works, (one of the Partners of the House of James Finlay and Co. Merchants, Glasgow,) for his Invention of Improvements in Machinery heretofore employed in Spinning Mills in the Carding of Cotton and other Wool, whereby the top Cards are regularly stripped and kept clean by the operation of the Machinery, without the agency of Hand Labour.*

[Sealed 4th December, 1823.]

THE general construction of the carding engine, commonly employed for separating the fibres of cotton or wool, is not professed to be altered by the present invention, but an apparatus is proposed to be added thereto for the purpose of brushing and cleaning the cards by the machinery, instead of performing that operation by hand as usual, the intent of which improvement will be best understood by a description of the carding engine itself.

Plate III. fig. 2, is a side view of a carding engine, nearly though not exactly of the ordinary construction, but such as the patentee prefers to employ, and to adapt his improvements to: *a*, *a*, *a*, is a box enclosing a large cylinder or drum, the periphery of which is covered with cards, (a sort of wire brush.) The cotton having undergone the first process of carding, is rolled up and

placed in the machine as at *b*, bearing upon rollers, *c, c.* From this roll, *b*, a sheet or sliver of cotton is drawn and conducted through between the guide rollers, *d*, where the teeth of the cards as the drum rapidly revolves tear away the filaments of cotton and deposit them upon the upper cards, *e, e*, placed round, facing the outer periphery of the drum.

These upper cards, *e, e*, are straight pieces of board laid close to each other across the machine, which boards turn over upon hinge joints: they are covered with wire brushes, (cards) on the under side, which very nearly touch the periphery of the carding cylinder; and as it revolves the points of the cards take up the filaments of cotton. By these means the filaments become separated, combed, or carded, and are laid in a thin strata round the periphery of the carding cylinder, from whence the cotton is drawn off by the card roller, *f*, and is removed from the periphery of that roller in a thin sheet by means of a vibrating doffer, *g*; this sheet of cotton is, after passing under the roller, *h*, drawn together into the trumpet-mouthed guide, *i*, and is then led off between the lateral rollers, *k*, into the can, *l*, where it collects ready for roving and spinning.

Such is the ordinary operation of a carding engine; and the revolutions of the feeding rollers, the large drum, and the card rollers, as well as the vibration of the doffer and other movements, are all effected by a rigger turned by a band leading from any first mover, the axle of which rigger causes the other parts of the machine to be actuated by other bands and gear, the arrangements of which, as connected with a carding engine, are well understood, and therefore form no part of the present patent.

In conducting the operations of carding cotton and

other fibrous materials, dirt and rough particles are apt to collect and lodge between the wires of the cards, and it is frequently necessary to stop the progress of the machine while the cards are cleaned; the object of the present invention is therefore to clean the cards while the operation is going on, and for this purpose a contrivance is adopted by which the cards, *e*, are turned up singly, and a rotatory brush is made to travel over them, which, as it advances, removes the dirt or other particles from the cards.

The axle to which the first moving power is applied is in the lower part of the machine at *m;* upon this axle there is a bevelled toothed wheel, which, by means of a corresponding bevelled wheel turns the shaft, *n;* this shaft has an endless screw taking into the teeth of a crank wheel, *o*, and to the side of this wheel, *o*, there is attached by means of a joint a crank-rod, *p*. At the upper part of this rod, *p*, there is a rack which takes into a toothed wheel, *q*, that slides loosely upon the axle of the large drum, and affixed to this wheel, *q*, is the vibrating lever, *r*, that carries the cleaning brush, *s*, having a balancing weight at its lower extremity. It will now be perceived that the slow rotation of the crank wheel, *o*, causes the crank rod, *p*, to traverse up and down, and by its rack taking into the teeth of the loose wheel, *q*, to cause that wheel and the lever, *r*, to move to and fro through a portion of a circle.

On the axle of the large drum, on the opposite side of the machine to that shewn in the figure, there is a tappet wheel, that is, a wheel with several projections or tappets on its periphery, and on the inside of the arm, *r*, there is a sliding rod, which is raised, by the tappets successively coming against its lower extremity. At the end of each of the upper card boards, *e*, there is a pro-

jecting piece, (not seen in the figure) being also on the reverse side, which is acted upon by the rising of the sliding rod last described, and by these means, as the arm, *r*, advances, the card boards, *e*, are individually turned over in succession, and the points of the wires or cards placed upwards. The brush, *s*, is of a cylindrical form, extending across the machine; it is supported in bearings at the tops of the arms, *r*, and has a pulley wheel upon its axle with a band passing over it from a rigger on the end of the axle of the large drum, by the rotation of which it is actuated. Thus as the arm, *r*, is made to advance by means of the crank wheel, *o*, the rack, *p*, and wheel, *q*, before described, the brush, *s*, revolves, and cleans out the dust and other rough particles from the cards one after the other; and the small rack, *t*, affixed to the side of the arm, *r*, taking into the teeth of the toothed segments at the ends of the card boards, *e*, shewn in the figure, turn them over again, after being cleaned, into their proper situations facing the periphery of the large drum. When the brush, *s*, has come down in contact with the roller, *f*, it cleans the dirt and other matters from the cards on the periphery of that roller; and when it has passed over to the opposite side of the machine, the brush comes in contact with a comb or row of needle points, *v*, which removes the dust and other matters it imbibed during the operation, and these fall into the trough, *u*, below.

When it is found necessary to sharpen the points of the cards which have become dull by use, a grinding cylinder may be placed in the situation of the rotatory brush, and the same contrivance of machinery above described being adopted, the cards will be turned over and the rotatory grinding cylinder sharpens the points as it passes over them.

[*Inrolled April*, 1825.]

To John White, *the younger, and* Thomas Sowerby, *both of Bishops Wearmouth, in the County of Durham, Merchants, for their New Invented Improved Air-Furnace, for the purpose of Melting or Fusing Metallic Substances.*

[Sealed, 6th November, 1824.]

This furnace is designed to melt pig-iron, or cast-iron, for the purposes of a foundery; this kind of iron is usually prepared in what is called a reverberating furnace, or in a small blast furnace, but the present is differently constructed, having several flues or air passages, by which a current of air may be conducted over the metal in different directions. Plate IV., fig. 2, is a section of a furnace upon this principle, having lateral openings or passages for conducting the air to the interior; *a*, is the upright part or mouth of the furnace, *b*, the bed, *c c*, lateral flues or passages by which air passes to the furnace—of these there may be several; *d*, is the chimney which the flues ultimately lead into; this chimney is to be carried up to the usual height of a reverberating furnace; *e*, is a cast-iron cover for closing the mouth; and *f f*, are dampers placed in the flues, for the purpose of regulating the draft and directing the flame.

When the furnace has become properly heated, which is readily known by persons accustomed to the business, then portions of metal and of coke are to be alternately thrown in at the top or mouth, and covered by the cast-iron plate. The metal as it melts, will run down to the lower part of the bed, *b*, where a constant flame is made to pass over it, in order to prevent its chilling, by means of the current of air admitted through the lateral passages, *c c*; which current passes through the furnace to the

chimney, and the fluid metal when ready for casting, is drawn from the bed by a tap hole as usual.

The form of the furnace may be square, round, oval, octagonal, or of any other figure that may be deemed suitable, provided that the principle is retained, (viz.) that of conducting currents of air in different directions through the furnace, by means of lateral flues, so that the heat may be directed in the furnace as circumstances shall require it to be applied.

[*Inrolled, February*, 1825.]

To William By, *of Joy Cottage, Joy Place, Brighton, in the County of Sussex, Stationer and Bookseller, for his Invention of a Method or Apparatus for the Preservation of Books and Covers.*

[Sealed, 14th April, 1824.]

The objeet of this invention and the manner in which it is to be effected, we are equally at a loss to comprehend, the patentee says " they are generally made," (that is we presume the book covers) " of leather, in different sizes, to suit every description of book. Each cover is lined with velvet, leather, paper, or such other material as fancy may direct. Between the lining and its cover, is passed a ribbon or tape, having at each end a spring and clasp, the clasp being so formed, as to catch the edges of the boards in which the books are bound or placed within; the cover or loop is formed to admit a book between its leaves, which can be drawn tight, and fastened at the back by a button

buckle or loop, which fastening may be varied according to fancy. The covers may be made with or without the loop.

"Many other materials may be used beside those enumerated, (viz.) parchment, vellum, silk, satin, cloth, &c. &c. according to fancy. They may also be made without linings, each cover may have one or more pairs of strings and clasps. Covers made without a lining throughout, must have the springs passed under a strap of leather, or any other material suitable for that purpose, leaving room for the proper action of the springs."

This is all that is contained in the descriptive part of the specification, and what the patentee intends to effect or professes to have invented, we leave the reader to discover.

[*Inrolled October*, 1824]

To JOSEPH CLISILD DANIELL, *of Stoke, in the County of Wilts, Clothier, for his Invention of certain Improvements in dressing Woollen Cloth.*

[Sealed, 20th November, 1824.]

THIS invention is the application of combs or cards to the surface of woollen cloths, in the operation of dressing or finishing them, for the purpose of laying the pile or nap in a uniform manner in one direction only, and also of retaining the position of the nap, and glazing the cloth when its pile has been so laid, by the employment of heated boxes, passed against the distended surface of the cloth, to effect the same object as is usually performed by smoothing irons.

Machinery calculated to produce this object, may be

variously constructed and modified, the patentee does not therefore confine himself to any particular arrangement, but exhibits such a contrivance as he has himself used, and found to be conveniently suited to the purpose. Plate IV, fig. 1, is a section taken across the end of the machine, observing that the length of the machine will depend upon the breadth of the cloth to be dressed. The piece of cloth about to be operated upon, is rolled upon the cylindrical roller, *a*, having been previously wetted or damped with cold water, but not left in a dripping state. From the lower roller, *a*, it is conducted over the periphery of the dressing cylinder, or drum, in the middle of the machine, to the upper roller, *b*, to which it is attached, and these rollers being made to revolve, by means of riggers or gear connected to their axles, in any of the usual ways, the cloth is drawn from the lower roller on to the upper roller, much in the same way as in ordinary gig mills, while the dressing cylinder moves with great velocity in a contrary direction, rubbing against the surface of the cloth.

The construction of the dressing cylinder in the middle of the machine is peculiar; it consists of several hoops or a hollow wooden barrel, on the outer periphery of which is placed four or any other convenient number of hollow brass or copper boxes, *c*, *c*, and *d*, *d*, these boxes are to be heated by steam, and for this purpose the axle, *e*, of the drum is made hollow, and is connected by a properly constructed stuffing-box to a steam pipe, leading from a boiler. Hollow arms, *f*, *f*, *f*, *f*, extend from the axle to the boxes *c*, *c*, and *d*, *d*, and by means of these the steam is conducted from the axle into the boxes. At the lower or outer edge of each box on its side, there is a small hole for the purpose of allowing the steam to blow through, to prevent its condensing within, or to permit the water, if any condensation should take place,

to be blown out. The outer periphery or surface of the boxes, *c*, *c* and *d*, *d*, are not alike; the surfaces of the boxes, *c*, *c*, are made perfectly smooth, in order to run against the cloth and lay its nap evenly, but the outer periphery of the boxes, *d*, *d*, are made with indented or waved ribs, that is, ribs extending straight along the boxes, but scolloped or indented on their edges. These indentations are so placed, that the protuberant part of one shall come opposite to the hollow of the other, and by the employment of these uneven surfaces, it is considered that the nap of the cloth will be more effectually laid down. Between these heated boxes blocks are placed with cards or wire brushes on their periphery, the points of which reach up to about the same elevation as the boxes. These cards are intended to comb the wool or pile upon the cloth previous to its being laid smooth and glazed by the heated boxes.

The barrel so constructed and mounted in the frame, is made to revolve with considerable velocity by means of a rigger or gear in an opposite direction to that in which the cloth is proceeding; and thus, as the cloth winds from off the bottom roller on to the top roller, the rapid revolution of the drum causes the cards or wire brushes to comb down the pile or nap: and immediately following, the heated boxes to lay smooth and glaze the surface of the cloth, which will give it an extraordinary brilliancy in appearance, and a peculiar softness to the touch; thereby obtaining a preference over cloths of similar quality, dressed by the ordinary means.

[*Inrolled March,* 1825.]

To CHARLES JEFFERIES, *of Havannah Mills, near Congleton, in the County of Chester, Silk Throwster, and* EDWARD DRAKEFORD, *of Congleton, in the said County, Watchmaker, for their new Invented Method of making a Swift, and other Apparatus thereto belonging, for the purpose of winding Silk, and other fibrous Materials.*

[Sealed 29th July, 1824.]

THIS invention is a mode of constructing a swift, or reel, for winding silk and other fibrous materials, which shall be capable of having its diameter varied by very simple means, and shall thereby extend or contract its periphery, so as to wind any required quantity or length of material in a given time, by a certain undeviating velocity of the swift.

The arms are made to slide in and out of the sockets, by means of racks on their sides, in which the teeth of a central pinion works. By turning the pinion in one direction, the rack and arm is drawn inwards, so as to lessen the diameter of the swift; and by turning the pinion in the reverse direction, the rack and arm is projected outward, so as to enlarge the diameter of the swift.

Plate III. fig. 3, is an end view of the swift, and fig. 4, is a cross section shewing only one of the arms. The arms, *a*, *a*, are enclosed in tin boxes, *b*, *b*, *b*, *b*, *b*, *b*, one of which is seen in section, at fig. 3, for the purpose of exhibiting the manner of sliding the arms. Each arm, *a*, has a rack on its side, into which the pinion, *c*, in the centre works; this pinion is encompassed by a circular box, *d*, shewn in section and more perfectly seen at fig. 4. On the face of the circular box there is a cap, *e*, with a milled or rose edge, which cap is fastened to the pinion,

c, and hence by turning the cap *e* round, the pinion, c, is turned also, which taking into the racks of all the arms, causes them to slide simultaneously, and by that means to enlarge or reduce the diameter of the swift, the periphery which is formed by the crutch ends, *f*.

In a similar manner, reels for winding silk, and other fibrous materials, may be made to enlarge or contract, by sliding the arms which support the outer rods. In constructing a reel upon this principle, it is proposed to make the central part a hollow drum, with an iron shaft running through it, which are held fast together by a pall and ratchet wheel; and this being turned round, causes the pinion upon the shaft to move the racks, which extends the arms much in the same way as already described.

[*Inrolled, September*, 1824.]

To John Thompson, *of Pembroke Place, Pimlico, and of London Steel Works, Thames Bank, Chelsea, for his Improved Mode of making Refined or what is commonly called Cast Steel.*

[Sealed 9th Dec. 1824.]

This improvement is said to consist, first, in substituting for the upright furnaces, usually employed in melting steel, an air or reverberating furnace, or what is commonly called a puddling furnace, subject, however, to such variations in dimensions, as will admit the melting pots about to be described; and secondly, in the construction and disposition of such melting pots, which are

not intended to be removed from the furnace, but to be tapped, and the fluid metal allowed to run out immediately into the moulds.

The bottom of the furnace is to be built solid from the ground, and one or more melting pots, or troughs fixed within, in such situations as to be enveloped by the fire. The form of the melting pots is to be semi-cylindrical, about two feet nine inches long, and twelve inches diameter, with hemispherical ends; they are to be made of Stourbridge clay, or fire-stone, about an inch and half thick, but need not be precisely limited to those dimensions. These troughs are to have covers of similar form, which must be made fitting exactly into grooves, or rebates, on the top edges of the trough.

These troughs are to be placed across the furnace, inclining a little towards the discharging side, and a small hole is to be made near the bottom of each trough, to receive a socket made of platina, to which a pipe, or tube of fire-clay is to be joined, and this tube passed through the brick work to the outside of the furnace. Several of these troughs may be built within the furnace, with pipes extending to the outside, and the external apertures closed with clay, until it is necessary for the fluid metal to be tapped, which is done by introducing the point of a long rod, tipped with platina, into the hole, when the metal is allowed to flow into moulds placed near the top hole.

It is recommended, that these furnaces should be kept going day and night by two sets of men, changing at suitable times, and that the trough should never be removed while sound, in order that no loss of fuel may arise by allowing the furnace to cool, and which will also greatly reduce the labour and expense of working.

The patentee concludes his specification, by stating

that the invention consists, "1st. In employing a reverberating furnace, instead of an upright air furnace, by which pit coal can be used instead of coke. 2ndly. In a trough or vessel, for melting in such furnace, the necessary materials for making refined steel; and instead of crucibles, I employ my troughs or vessels, and by tapping and discharging their contents of fluid metal, while they are in the furnace, into the desired moulds, and never removing the troughs while they are capable of performing their duty. These are the primary means by which I have performed and constituted my improved mode of making refined or cast steel."

[*Inrolled, February* 1825.]

The object and leading features of this invention, appear to be the same as those for which a patent was granted to Mr. F. H. W. Needham, in October, 1824. See our present Vol. page 23.—EDITOR.

To JEAN JACQUES SAINTMARC, *of Belmont Distillery, Wandsworth Road, Vauxhall, in the Parish of Saint Mary, Lambeth, in the County of Surrey, Distiller, in consequence of Communications made to him, by certain Foreigners residing abroad, and discoveries by himself, for the Invention of Improvements in the Process of, and Apparatus for Distilling.*

[Sealed 20th March, 1824.]

THE intention of the patentee, is to distil alcohol from potatoes, and the subject of his improvement is described under two heads, (viz.) the mode of preparing the potatoes, ready to be converted into wash, and the general arrangement

of the apparatus, for conducting the fermentation and distillation, so as to retain the natural flavour of the spirit, and at the same time economise the use of fuel.

It is first proposed to wash the potatoes free from the earth which adheres to their skins, by placing them in a rotatory drum, formed by open rails or staves, which drum is immersed in a trough or other vessel filled with water. When thus cleaned the potatoes are to be introduced into a mill, for the purpose of being ground to a pulp. The construction of the mill to be employed is rather peculiar; it consists of a box as usual, containing a cylinder having ribs of iron set into the periphery of the cylinder, which ribs are to be notched, or formed on the outside into teeth like fine saws. Two pieces of wood at right angles, the one standing in a perpendicular, the other in a horizontal direction, are to be brought up against the cylinder on one side, and the potatoes introduced from a hopper above, are let fall between the cylinder and the wood, when by the rotation of the cylinder, at the rate of about four hundred revolutions per minute, the potatoes become ground to a pulp, which descends into a receptacle below, there being a wooden scraper behind the cylinder, in order to prevent the pulp from adhering. The perpendicular piece of wood is made to give way by means of a spring behind it, for the purpose of allowing the larger potatoes to come in contact with the cutting cylinder, and the horizontal piece of wood is adapted with screws, in order to keep it up constantly against the cylinder which wears away the wood as it revolves.

The pulp of the potatoes thus produced in the mill, is now to be mixed with a considerable quantity of water, sufficient to bring it into a liquid state; it is then strained through a sieve, and such portions of the potatoe as will not pass through the sieve, are rejected as useless and set apart for feeding animals.

The liquor thus strained, is then to be poured into a sort of cullender or vessel having many holes, which vessel is lined with a cloth; and here the pulp is allowed to settle, and the water to drain away, leaving the substance of the potatoe in a cake at bottom. This cake is then laid out upon a plaister floor, that its moisture may be drawn out by absorption, and afterwards it is dried in a kiln, where it may be kept perfectly good for a very great length of time.

In commencing the process of distillation from the prepared potatoes, the cake must be first broken and dissolved, by mixing with hot water till it has assumed the consistency of cream. A quantity of this liquor is then placed in a vat, which may be supposed to be situated as shewn at *a*, in Plate IV. fig 3. This figure shews the whole range of apparatus in action, from the vat, *a*, in which the pulp is first introduced previous to fermentation, down to the worm where the distilled spirit is ultimately condensed.

Let the quantity of potatoe pulp introduced into the vat, *a*, be equal to about three hundred weight when in a dry state, but mixed in the vat with hot water, to about the consistency of cream, as before mentioned; let there be water poured into the vessel, *b*, until it rises about six inches from the bottom, and into this water introduce twenty pounds of sulphuric acid, observing that the vessel, *b*, should have a lining of lead, to prevent the action of the acid upon the wood. The cock of the vat, *a*, is now to be opened, and the liquor contained therein, allowed to flow into the vat, *b*, which is called the decomposing vessel. Another portion of the potatoe pulp, may then be mixed in the vat, *a*, and let off into the vat, *b*, as before; and so on, until the vat, *b*, is sufficiently full. The proportion of acid to the pulp, necessary for decomposing it, should be from two to

three pounds of the former, to every hundred weight of the latter.

Steam is now to be sent into the vat, *b*, through the pipe, *c*, from a boiler, and by means of this steam, the liquor in *b*, is made to boil, and is to be kept boiling for four or five hours. The steam which evaporates from the vat, *b*, is allowed to pass up a worm pipe in the tub, *d*, which by that means heats the water in the tub, so that none of the heat is lost, and hot water may then be drawn from the tub, through a pipe, to supply the vat, *a*.

After the boiling in the decomposing vessel is complete, the liquor is let off into the third vat, *e*, which is called the saturating vessel. During the time that the liquor is flowing into this vessel, a quantity of lime and water, or chalk and water, is introduced in order to neutralize the sulphuric acid; two or three pounds of chalk is generally sufficient for one of acid, but the introduction of the chalk, or lime, must be continued as long as any effervescence arises from the liquor.

When the liquor has subsided in the saturating vessel, it is to be drawn off into the fermenting vat, *f*, where a quantity of yeast is added to promote the fermentation. The temperature of this vessel is to be kept up to about ninety or one hundred degrees of Fahrenheit's thermometer, and the room in which the operation is going on to eighty or eighty-five degrees, during the whole time of its fermenting, which usually takes fifteen or twenty days. To facilitate the fermentation, hydrogen gas is proposed to be injected into the liquor, by means of a force pump, through the pipe, *g*, which has a number of small holes in the lower part of the pipe, branches from which are coiled about the bottom; but this injection need not be

made when the carbonic acid gas, which escapes, contains an excess of hydrogen. This mode of introducing hydrogen into the wash, may be advantageously employed to facilitate fermentation, whenever liquor is intended for distillation. The sediment of the vat, *e*, should be stirred up to prevent the loss of any saccharine matter, and allowed to run into the fermenting vat.

When the process of fermentation is complete, the liquor is to be run from the vat, *f*, into the still, *h*, through the pipe, *i*, and is then to be operated upon in the usual way. The form of this still is, however, something different from those stills commonly used; it is without the usual hand, and it is here intended that the evaporation shall pass up the long tube, *k*, in doing which it will become partially condensed, and run down again into the still; but the more volatile or spirituous part will pass over the neck at top and proceed down the pipe to the worm, *l*, immersed in cold water, where it will become condensed, and discharge itself at the extremity of the pipe into any vessel placed under it.

The produce of this first distillation is called low wine; it is therefore necessary to pass the liquor again through the still before it becomes a highly concentrated spirit. For this purpose, it is to be carried to another still, shewn at *a*, fig. 4. Here the operation of distilling is conducted in the ordinary way, and the spirituous vapour passing up the pipe, *b*, descends into the closed vessel, *c*, which is cooled by a reservoir of cold water, in a trough, *d*, at top. Here the spirit boils, and as it rises, passes up the pipe, *e*, and descends into the long cylindrical vessel, *f*. This vessel is immersed in a trough of cold water, and is divided by partitions into six compartments, having small bent pipes leading from one to the other. The heaviest portion of the

spirit condenses in the first compartment, and the volatile part proceeds through the pipe to the next, where the second heaviest becomes condensed, and the lightest passes through all the compartments, and proceeds through the pipe, *g*, to the worm immersed in the tub, *h*, from whence it discharges itself into a suitable receiver.

The spirit condensed in the cylindrical vessel, *f*, may be passed through the small pipes at the bottom of each compartment into the long pipe, *i*, and from thence drawn off for rectification; or it may be passed from the long pipe into the closed vessel, *c*, and from thence through the pipe, *k*, to the still for further distillation.

The specification concludes by stating that the invention consists, first, in the process by which a spirituous liquor is obtained or extracted from potatoes; and, secondly, in the improved arrangement and construction of apparatus for effecting the processes of fermentation and distillation.

[*Inrolled September*, 1824.]

T o JAMES M'CURDY, *late of New York, United States of America, but now of Snow Hill, in the City of London, Esq. in consequence of a communication made to him by a certain Foreigner, for an Improved Method of Generating Steam.*

[Sealed 15th June, 1824.

THE object of this invention, is to produce steam for the working of a steam engine without employing a boiler, the method adopted is, by injecting water into a red hot chamber, where it instantly becomes steam of high pres-

sure, and escapes by a suitable pipe to the induction aperture of the engine.

This mode of producing steam may be effected by apparatus under such a variety of forms, that the patentee has not thought fit to exhibit any, but states that the subject of the patent may be considered under three heads; first, the construction of a hot chamber, in which steam may be generated by the injecting of either hot or cold water; secondly, in equallizing the distribution of the water over every part of the chamber; and thirdly, in charging the chamber with a head or body of steam ready to start the engine.

The generator is proposed to be made of wrought or cast iron, in a cylindrical form, from six to twelve feet long according to circumstances, with closed ends, which is to be built into a furnace, and heated to redness. At one end a small tube is to be inserted, and carried through the whole length of the cylinder, this tube must be perforated with small holes, through which the water may be forced from a reservoir without, by means of a forcing pump, to be worked by hand, or by an attachment to the engine. By these means, the injected water will be made to spirt from the holes of the tube in every direction, and coming against the heated surface of the cylinder, will immediately flash into steam.

At any convenient part of the cylinder a pipe may be inserted for the purpose of conducting this steam away to the engine, and the aperture through which the steam passes may be closed with a loaded valve, so that the steam shall only pass off to the engine when it has reached a certain high pressure. In commencing the working of the engine, therefore, it is only necessary to put the force pump in action, when a sufficient quantity of high pressure steam will soon be formed within the

chamber to start the engine, and every stroke of the pump injecting a fresh supply of water, the force will be kept up as long as the pump continues going. It is considered that half a gill of water will produce a sufficient quantity of steam to exert a power equal to four or five horses.

The prominent advantages contemplated by this invention, when applied to work a steam engine, are, a diminution in the first cost of the steam apparatus, as a large and expensive boiler is dispensed with; a great saving is likewise effected in the weight of the steam generator, and also in the room occupied, as well as in the consumption of fuel, which is particularly desirable when a steam engine is to be adapted to propel a vessel on water, or a carriage on land. The perfect exemption from danger is another important consideration which the plan is said to ensure; and lastly, the simplicity, strength, and durability of the apparatus is a further recommendation to its adoption. As the plan proposed necessarily confines the magnitude and power of the steam chamber, or generator, within certain limits, it is intended when very great power is required to combine several of these generators in one furnace, or to erect several furnaces with such generators near together, and to bring the steam pipes into union, so as to supply one engine.

The specification concludes by saying that the claims of the patentee are:—" First, for converting water, either warm or cold, direct from the reservoir that supplies the forcing pump instantly into steam of any required pressure, and in sufficient quantities to drive the engine, without the use of any boiler under pressure. Secondly, the mode or method of distributing the water through every part of the steam chamber, so as to diminish as

little as practicable the action of the fire upon the steam chamber. Thirdly, for creating a head of steam, by charging the steam chamber previous to starting, and without the use of the engine."

Inrolled, December, 1824.

To JOHN GIBSON, *Woollen Draper and Hatter, in Glasgow, for his new Invention in the manufacturing or making of an elastic Fabric, from Whalebone, Hemp, and other Materials combined, suitable for making into Elastic Frames, or Bodies for Hats, Caps, and Bonnets, and for other purposes; and also the Manufacturing or Making of such Elastic Frames, or Bodies, from the same Materials, by the Mode of Platting.*

[Sealed 15th June, 1824.]

THIS elastic fabric, is proposed to be made, in the first instance, from whalebone, which is to be woven into a sort of cloth, by the following means. In order to effect the object, the whalebone is to be separated into threads, as small, or smaller, than hay stalks; these threads are then to be boiled in alum and water, or some other alkaline liquid, for the purpose of removing the oil from them, and rendering them more elastic; the threads are then to be sorted according to their lengths, which will generally vary from one foot to twelve feet. The longest are to be employed as warp threads, and the shorter ones as weft; and in a loom of the kind in which hair cloth is usually made, this whalebone fabric is to be woven. The means by which the opera-

tion of weaving may be performed, is so well understood, that any particular description of it here is unnecessary.

The patentee proposes under some circumstances, to combine other materials with these whalebone threads, or to employ whalebone threads for the warp of the fabric, and hemp or other materials for the weft, or *vice versa*, according to the direction in which the elasticity is to be afforded. When a short length of cloth has been made, nearly to the extent of the length of the whalebone threads, which forms the warp; it is proposed to join other threads to the ends of these, and to pass them through the headles, and continue the weaving to any greater length that may be desired.

When the fabric or cloth has been thus made, it is to be passed between rollers, or by some other means pressed, in the manner of hair cloths. It is then fit to be cut up into forms for making hats and bonnets, or other purposes, and may be sewed together at the joints, and stiffened with a preparation of resinous gums, or varnish, to prevent its being acted upon by the perspiration of the head.

The patentee further proposes, to form a cloth or fabric, from whalebone threads, or other materials, combined with whalebone threads, by platting them together in the ordinary way of platting, either upon blocks, suited to the forms of the intended hats and bonnets, or in pieces, out of which the forms are to be cut, and united at the joints by sewing, as before described.

Inrolled, October, 1824.

To RICHARD HOOTON, *of Aqueduct Iron Works, Birmingham, in the County of Warwick, Iron Manufacturer, for his Invention of certain Improvements in manufacturing wrought Iron.*

[Sealed 15th June, 1824.]

The patentee describes his improvements in manufacturing wrought iron, in the following words: "My invention consists in rolling iron from any number of pieces of puddled billets, (more than one) which I fasten together by hand, or otherwise."

Inrolled, December, 1824.

Original Communications.

To the Editor of the London Journal of Arts, &c.

SIR,

IN a Journal expressly devoted to improvements in the mechanical arts, among which the steam engine may be considered to stand foremost, it cannot I think be deemed irrelevant to introduce a few remarks upon the qualities of the different kinds of coal which are found in our island; as I believe by far the greatest part of the improvements which have been introduced, connected with the steam engine, have for their principal object a reduction in the quantity of coal, or other fuel necessarily consumed in the generating of steam, to produce the action of the engine. I shall, therefore, with your permission, state the results of a series of experiments,

which have been made under my own observation, by a house of great respectability, and practical knowledge in matters connected with chemical and mechanical science, with a view to determine the particular quality of coal best suited for steam vessels and locomotive carriages.

It has been a subject of enquiry, why the demand for Scotch coal, which formerly maintained a decided superiority in the London market, should have so much diminished. Is it owing to the alleged comparative cheapness of the latter, because of longer duration in burning? or that there is more inferior coal in Scotland, and the mistaken judgment of the proprietors has led them to press it into competition with the English, the best sorts of which only are sent to London?

The bituminous or caking qualities of the English coal seems to favour the first supposition; but as this quality renders it less active as to flame and heat, it is rather to be considered as a negative quality, and so much the less fit to be employed where an intensity of heat is required. The combination of sulphur and hydrogen, too, which produces the bituminous quality, is attended with great inconvenience in a furnace. The sulphur by chemical affinity adheres strongly to the iron of the bars, from which it takes a scale at every removal of the cinders, and they in consequence become a real scoria of iron, which is not inaptly termed by the workmen a clinker, from the metallic sonorous sound it gives out when struck by a hammer or other hard substance, indicating the iron it holds in combination. The bars from this circumstance require frequent cleaning and removal, and those parts of the surfaces of the boiler which are exposed to the fire by that means becomes greatly injured, which reduces the strength of the boiler

perhaps in some hidden part, and ultimately causes a destructive explosion.

These reflections, and the importance of the subject in a practical point of view, has led to the experiments above alluded to, which are both interesting and curious; and having been conducted with the greatest care, and attention to accuracy, the results may implicitly be depended upon.

The trials were made under a large steam boiler in which the water was kept at one uniform heat, and the engine performing the same work. The quantities consumed of the different kinds of coal below mentioned, to effect the same expence of power, and the incombustible residuum which remained from each were as follows:—

Swansea Cox's coal—burnt	50,99	leaving a residuum of 92
Barrington ————	47.87	———— 101
Staffordshire (Tipton)——	48.17	———— 93
Inverkeithing ————	47.65	———— 8

Upon a second trial the results were as follows:—

Elgin coal	burnt 41.21	residuum left 85
Lidney————	39.02	———— 79
Tanfield Moor ————	40.96	———— 122
Inverkeithing ————	35.90	———— 69

Varying the experiment, one ton of Inverkeithing coal, *Holbeath Splint* (*Prathouse Main*,) burnt forty-seven hours three minutes, and left a residuum of only eight pounds.

One ton of Northumberland coal, burnt forty-six hours thirty-five minutes, and left one hundred and one pounds residuum.

One ton of Staffordshire coal, burnt forty-six hours thirty minutes, and left ninety-three pounds residuum.

One ton of Welch coal, of the sort used for malt-kilns, burnt forty-three hours fifty-five minutes, and left ninety-two pounds residuum.

The difference in the residuum, is not the only part of the experiment worthy of consideration, as the substance usually left upon the bars injures them, and obstructs the draft, when the furnace is again to be fed; so that a continuation of the trial, would in all probability have had still more decisive results.

The effect of these experiments is, that the Inverkeithing coal stands unrivalled in every quality desirable in a coal, and consequently for steam vessels and locomotive carriage it is more especially to be preferred to every other kind of coal at present known.

Having referred in the opening of this paper to the diminished consumption of Scotch coal in the London market, allow me to observe, that for all domestic purposes the Inverkeithing coal is equally eligible to the Newcastle, Staffordshire, or Welch, as it has in addition to the advantage of lasting longer, according to the quantity of heat and flame it produces, the merit of being free from the hydro-sulphurous smell of highly bituminous coal, which is extremely noxious, as well as injurious, to the lungs and the eyes; to which may be added, the cheerful appearance of a large block of coal lighting up the whole area of the chimney and the room, with a mild lambent flame, during all the time it is burning, truly rendering the fire what foreigners say it is to us, a companion, and not a troublesome one, requiring as some coals do, to be constantly poked and stirred, to be kept alive

Trusting this subject may not be thought unworthy a place in your scientific Journal, it is respectfully submitted by Sir,

Yours, &c.

Charbon Vif.

Novel Inventions.

New Coinage.

We are much gratified in learning, that an English artist has at length been found worthy of the honour of being employed to produce a series of new dies for the coin of the realm. It has long been a matter of astonishment, that in an age like the present, when the highly cultivated state of the arts in Britain has placed every other country in the shade, the directors of our national mintage should have had recourse to the talents of a foreigner, to produce a series of gold and silver coins, which, without considering the impropriety of the devices, are both, as respects their design and manner of execution, incomparably inferior to a Birmingham halfpenny, or even to the better order of buttons.

The public have now to congratulate themselves upon a new coinage, which will be worthy of the age and nation in which we live. Mr. Wallace, the present master of the mint, has we understand, personally exerted himself, in devising the subjects to be impressed upon the

new coin, which certainly reflects great credit upon that gentleman's taste; it is however to the talents of Mr. W. Wyon, that we are indebted for the execution of a series of dies, certainly superior in every respect to any coin that has before appeared.

The gold pieces are sovereigns and half sovereigns, double sovereigns, and five sovereign pieces. The silver, crowns and half crowns; the smaller pieces not being yet sufficiently forward to authorize us at present to expatiate upon their merits; but from the models which we have been favoured with the sight of, we have no hesitation in saying, that their designs display a classic taste, to which our present coins will not bear the most distant comparison.

The five sovereign gold piece is between the sizes of our present crown and half crown, it contains the profile of his Majesty, in bold relief, looking towards the left, and as far as our recollection goes, appears to be an excellent likeness; it is we understand copied from a painting by Sir Thomas Lawrence, and displays the naked neck to the collar-bone; the hair, which appears thick, is, we should say, laid in tasteful disorder; the wreath of laurel that has upon our coins hitherto entwined the brow of the monarch, is here omitted at the express desire of his Majesty; GEORGIUS IV. DEI GRATIA, 1825, encircles the head, and the raised edge of the piece is finished with an internal beading.

On the reverse is a planse shield, nearly square, with the royal arms, enclosed by a raised mantle, which is tied up by tassel cords at the upper corners in bunches, and hangs straight down on the sides, with festoons from the imperial crown at top. The inside of the mantle is represented with knots of ermine, and its outer edge is enriched by an elegantly embroidered border.

The arms are quartered, England in the first and fourth, Scotland in the second, and Ireland in the third, with an escutcheon of pretence and crown for Hanover, the fields of the quarterings are bright with the charges, neatly drawn, and raised in bas-relief; the inscription, BRITANNIARUM REX FID. DEF. is in elevated square letters, without the mantle, and the whole encircled by a beaded border, within the raised edge of the piece.

The double sovereign bears the same devices, but upon a smaller scale, and is equally elegant and highly finished.

The sovereign has the same head and inscription, but reduced in size, and its reverse exhibits the plain shield of arms and imperial crown without any mantle, but a tasteful scroll work decorates the edges of the shield, and the inscription is as upon the larger pieces, and the whole device on each side is encircled with a beading in the hollow of the ribbed edge, which is externally milled.

The crown piece in silver, is beyond all doubt the most superb coin that has ever been produced, its diameter is one inch four tenths and eight hundreth, the head is from the same model as the former, in very bold relief, it measures from the point of the chin to the crown, nine tenths of an inch, and from the crown, down to the lowest point of the throat, one inch and two tenths. The features, the muscles and the hair, are produced with infinite taste and ability, equal perhaps to the finest medal that has ever appeared; the size of the crown piece, allowing a larger space for the exercise of the artist's talents than either of the pieces before mentioned,—indeed we consider this coin to be a complete *chef d'œuvre* of the art. The head is encircled, as upon the other pieces, with the inscription in raised letters, GEORGIUS IV. DEI GRATIA, 1825, and is, we understand, intended to be the exact model for the face of all the coins that are to be produced in the present reign.

The reverse is extremely beautiful: it consists of a plain shield containing the royal arms, as upon the other pieces, above which in this is the helmet of the sovereign, open, and facing to the front, *gardevisure*, with semicircular bars, and embroidered upon the breast and shoulders; upon this is the imperial crown, and issuant from behind the helmet is a mantle elegantly flowing on the sides of the shield in a variety of tasteful scrolls; and below is a meandering ribbon upon the matted ground, of which is raised the motto, DIEU ET MON DROIT. The inscription BRITANNIARUM REX FID. DEF. extends round the sides of the coin, and the whole is circumscribed by a bead within the hollow of the raised edge.

The half-crown bears an exact fac simile of the devices on the crown piece, but upon a smaller scale, the edge of the crown has the usual motto for protection, raised upon a plain rim, that of the half crown is milled.

We feel that we have not done sufficient justice to the subject before us, but as the coins will very soon be in general circulation, the public will be enabled to exercise their own judgment upon the merits of the execution.

Economical Candles.

Doctor O'Neil, of Comber, has discovered a process, by which lard may be used for making candles; he renders this substance superior to the Russia tallow, and not so expensive. The lard, after having undergone his process, resembles white wax or spermaceti. Candles made of this prepared substance, burn with a brilliancy superior to common candles, and it is said even to gas; they are free from any unpleasant smell, and do not feel greasy to the touch, nor give off any smoke; they burn much longer

than candles of the same weight, and by a slight alteration in the process, they can be rendered yellow or of any other colour, or as white as snow, which neither light, air, or smoke can alter. We should be happy to hear the particulars of this process, but have some notion that it is the subject of a forthcoming patent here.

Method of Obtaining Brandy from Potatoes,

By Mr. Piemens.

The potatoes are put into a close wooden vessel, and there boiled by steam, which is communicated to them at a degree little above that of boiling water; after they are boiled or steamed, they are reduced to a paste with extraordinary facility, (which is done by machinery in the interior of the wooden vessel,) they then add boiling water to the paste, and a little potash rendered caustic by quick lime, the addition of the alkali is to dissolve the vegetable albumine, which prevents the complete conversion of the potatoes into starch.

The starch liquor, after being filtered and evaporated, gives a residue very pure and susceptible of being treated chemically; our correspondent says (I think they mean distilled.) They then draw off the brandy from the potatoes, which has the proper herbaceous taste, it is then mixed with chlorate of lime, by which process the brandy is rendered equal to that distilled from wine.

It will be observed that there is some difference between this process of obtaining spirits from potatoes, and that described in our present number, page 77, under the head Saintmarc's Patent.

A Process to render Cloth and Silk Water Proof.

By M. Collet.

The silk or cloth must be spread upon a wooden frame, and immersed or soaked with the following mixture: linseed oil, one pound, white lead, one ounce and a half, umber, one ounce, and a clove of garlic. The whole of these ingredients must boil for twelve hours on a small fire, and when the composition is perfectly fit for use, the surface will put on the appearance of skin.

The cloth after having been immersed in or washed with this composition, is to be hung up to dry, and when that is effected, to be rubbed with pumice stone to render it smooth. It is then to be coated with another thick fluid, composed of linseed oil, one pound, vitreous oxide of lead, one ounce, sulphate of zinc, four drams, and white lead, calcined till it has changed yellow, four ounces. These must be previously boiled together in an iron pot, until the material have the consistence of paste, the composition is then to be spread equally over the right side of the cloth, the material is then dried upon the fabric in a chamber heated to forty or fifty degrees; it is necessary to repeat the operation twice for silk, and the result will be the production of an oil skin cloth, which will be water proof, and not rub nor wash off.

Polytechnic and Scientific Intelligence.

Royal Society, 2d June, 1825.

A paper intituled Observations on the Materials of the Brain and Ova of Animals, by Sir Everard Home, Bart. was read.

In this paper, the author gives an account of several experiments, made with the view of ascertaining whether frogs completely frozen, could be restored to life, the result was, that in no instance when the brain had been congealed can restoration be effected, for in all such cases, that organ on being thawed, never recovered its former appearance, but was resolved principally into a watery and partly into a gelatinous substance, precisely the same results were obtained from the human brain, the molecula egg of the testicular secretion, from which the author infers that all these substances are composed of the same materials.

The description of a new method of determining the meridian, by John Pond, Ast. Roy., was also read.

The method described in this paper, as a *new* one, has been known and practised by astronomers ever since the invention of the transit instrument; it is that of ascertaining the greatest elongation in azimuth E. and W. of a circumpolar star, fixing marks in those points of the horizon which of course must be equidistant from the meridian, and then finding the exact point between them.

June 9th.—Charles Mansfield Clarke, Esq., was elected a fellow of the society. Mr. Bepel, Mr. Brogniart, Count Chaptal, Mr. Encke, and Mr. Fresnel, were elected foreign members, and the following papers read:—

Further researches on the preservation of metals, by electric chemical means, by the President.

This paper contains the results of some experiments made on the Samarang, and other ships of war, and on board the steam boat, lately sent into the north seas, for the purpose of determining the longitude of certain places. From their data the author concludes, that besides a chemical, there is also a mechanical wear of the copper in sailing; that the corrosion of the metal increases with the distance from the protecting metal; that the diminution of electrical action,

does not depend on the nature of the metallic substances so much as on the greater or lesser perfection of the fluid conductor. He also found that the finest leaf of talc or thinest stratum of air was sufficient to prevent the protecting influence, though an ordinary coating of rust or thin moistened paper did not impair it.

From these facts, he judges it expedient to have the copper sheathing of the purest kind, that it should be applied smoothly and equally, and attached to the vessel with nails of pure copper. This method was followed with success in the case of the Samarang. To the bottom of the ship four masses of iron were attached, two on the bows, and two near the stern, in surface equal to about one-eightieth of the copper. The vessel made a voyage to Nova Scotia, and returned remarkably clean, and in good condition.

June 16th.—Charles Mansfield Clarke, Esq. was admitted a Fellow of the Society, and the following papers read:—

On a new Compound of Carbon and Hydrogen, and on certain other products obtained during the Composition of Oil by Heat, by Mich. Faraday, Esq.

These experiments were made on the fluid which is obtained at the Portable Gas Manufactory, from oil gas under compression. It is very volatile, and from it was obtained, by repeated distillation or pressure, a substance which upon examination proved to be a new compound of carbon and hydrogen. This substance at a temperature of sixty degrees is a colourless transparent liquid of the specific gravity of 8,85″. Below 42° it forms itself into solid dendritical transparent crystals, contracting greatly in congelation; at 0° it becomes a transparent brittle pulverulent substance, about the hardness of loaf sugar. It evaporates in air, and boils at a

temperature of 186°, rising into a vapour of the specific gravity of 39, if compared to hydrogen as 1.

Mr. Faraday names this substance *bicarburet of hydrogen.* He analyzed it by passing it over red hot oxide of copper, and found it to consist of two proportions of carbon and one of hydrogen.

From the most volatile portion of the liquid, a gaseous substance was obtained, which at 0° condensed into a liquid. It is very combustible, and as a gas has a specific gravity of 28; as a liquid of 0.627, being the lightest liquid known. It contains exactly the same proportional of carbon and hydrogen as olefiant gas, but occupies only half its volume. It differs also from that substance in its combination with chlorine, with which it forms a fluid body resembling hydro-chloride of carbon.

With respect to its utility in the arts, the author thinks it may hereafter be used as fuel for a lamp; he found it an excellent solvent of caoutchouc, and thinks it may answer all the purposes to which essential oils are applied as solvents. He is still engaged in the examination of this interesting substance.

A repetition of Mr. Arago's Experiments on the Magnetism, was developed in various substances during rotation, by Messrs. Babbage and Herschel, and Experiments on Magnetism, by S. H. Christie, Esq.; but we defer giving an account of these papers for the reasons assigned in our last Number.

On the annual variation of some of the principal fixed stars, by John Pond, Esq. Ast. Roy.

The principal part of this paper, was stated to consist of a table of the annual variations of twenty-three of the principal fixed stars, deduced from the Greenwich

Observations, and from the Observations of Dr. Brinkley, at Dublin.

Description of a Hygrometer, by Mr. Thomas Jones.

The principle of this hygrometer, is the same as that of Mr. Daniell's, and differs from it only in the manner of applying the frigorific liquor. The bulb is large, somewhat flattened and extended at the end. The tube bent twice at right angles, so that the bulb turns upwards ; it is of black glass covered with muslin, except on the upper part, which is exposed. The muslin being moistened with æther, the mercury is cooled, and the dew settles on the uncovered part.

On the Function of Mortality, by Benjamin Gompertz, Esq.

The hypothesis adopted by the author is this, that in every person the resistance to death decreases as his age increases, and that this resistance may be represented by a double exponential function, or geometric progression, in which the common ratio of the terms, as well as the terms themselves, decrease in geometric progression. After comparing the results obtained from this hypothesis with those derived from the most esteemed tables of mortality, and shewing their correspondence, he proceeds to explain by algebraical formulæ, the application of the law to particular cases, and concludes his paper with an extensive set of tables calculated from them.

The Society then adjourned to Thursday, the 17th November.

Proceedings of the Royal Society of Edinburgh.

March 21, 1824.—A Paper, entitled Observations on the Motions of the Eye-ball, by Mr. Charles Bell, was read.

There was also read, Farther Observations on the Vision of Impressions on the Retina.

April 4.—The following gentlemen were elected Ordinary Members:

The Right Honourable Lord Belhaven.
Dr. Reid Clanny, Physician, Sunderland.

Sir JAMES HALL read a Paper "On the Consolidation of the Strata."

April 18.—A Paper on the Construction of Oil and Coal Gas Burners, &c., by Dr. CHRISTISON and Dr. TURNER, was read.

May 2.—The above paper was concluded at this meeting.

At the same meeting was read the Description of an Instrument for Registering the Indications of Meteorological Instruments, in the absence of the Observer. By H. H. BLACKADDER, Esq.

May 16.—Dr. KNOX read a Paper, entitled Observations on the Motions of the Eye-ball. The object of this paper was to demonstrate, in opposition to the opinion of Mr. Charles Bell, that the eye had no upward involuntary motion in a state of repose.

At this meeting Dr. TURNER exhibited to the Society the Experiment of Condensing the Gases into Liquids by their own pressure.

There was laid before the Society a paper on the Refractive power of the two New Fluids in Minerals,

with Additional Observations on the Nature and Properties of these substances. By Dr. BREWSTER.

There was also laid before the Society Astronomical Operations made at Paramatta, and communicated by his Excellency Sir THOMAS BRISBANE.

The Society adjourned its meetings till November.

Apparatus for Measuring the Distance a Carriage travels, adapted to a Gig.

MR. EDGEWORTH has communicated to Dr. Brewster, a simple contrivance to be attached to a carriage, for measuring and denoting the distance a wheel has travelled over. He says, "there have been a variety of machines applied to carriages, for counting the revolutions of the wheel, and thus measuring the distance travelled over; but all that I have ever heard of, wear rapidly and get out of order, as the machinery is placed on or near the axletree, on parts of the carriage that are subject to jar.

"For this reason, I was determined to suspend on the body of the carriage, which was on springs, all the machinery requisite for registering the revolutions of the wheel. I availed myself of R. Gout's patent pedometer, which is of little accurate use in the pocket, worn as a watch, for counting the number of steps in walking.

"I placed this pedometer horizontally in the elbow of the gig: It was there secure, concealed by a little door covered with cloth, so that the dial-plate was not easily discovered, except by a person who knew the opening. The difficulty in the machinery was to communicate mo-

tion to the pedometer, which being in the body of the gig, and of course on springs, was subject to constant alteration of distance from the wheel; but as the springs played in nearly a perpendicular direction, I passed through the side of the gig, an upright spindle, which came some inches below the axletree. The lower end was bent in a crank shape, and this crank came in contact with a pin of about half an inch diameter, that was driven into the nave near its circumference.

"Round the spindle there was a helical spring, which slightly urged the cranked part against the axletree, but every time the wheel revolved, the pin in the nave pushed the crank out for a few inches from the axletree, and it returned to its place by the action of the spring as the pin receded. On the top of the spindle was placed a lever of about two inches long, a little above the level of the pedometer; this acted against the short perpendicular arm of a crooked lever, the long horizontal arm of which lifted up the handle of the pedometer, and by this means caused the hand to advance one division on the dial-plate. Now, this horizontal arm was elastic, and allowed the motion communicated from the nave to be much more than was necessary for raising the handle; the elastic lever was also bent by the motion, so that no jolting should cause any variation in registering the number of revolutions. In fact, this idea of allowing by elasticity an overplus of motion, and of placing the whole machinery on springs, are the only new principles in this little contrivance.

"It will be best to have a mile measured accurately on a straight road, then, by driving backwards and forwards a few times, and taking the mean of the number of revolutions which the wheel performs in the mile, a table can easily be formed for any carriage, whatever may be the

size of the wheel, showing the value of the revolutions in miles, furlongs, and perches.

"When the roads are in good order, there will not be found a difference of one revolution in five hundred, or not one in the distance of a mile.

"It is curious, that, in wet weather, it always shows a smaller measure than the true, from this reason—that the tire of the wheel becomes lined with mud, which, in fact, adds to the size of the wheel. When the mud is very stiff and adhesive, there is a difference of one in two hundred. Measuring with the wheel of a carriage is more accurate than with the common wheel odometer, the carriage wheel being larger, and the load that it supports preventing the possibility of its slipping, and also tending to prevent the jumping that takes place when an unloaded wheel meets with any obstacle. The dial-plate of this pedometer admits of travelling more than twenty miles before the long hand makes a complete revolution, and the distances can be seen by mere inspection without stopping the gig.

"I tried this machine during five years of constant travelling, while I was employed on the survey of Roscommon: It remained in good order, and I found it saved me time in supplying any little omissions in the maps of my surveyors.

"This machine has also been used by a friend in London for some years, and he has found it remain free from sensible wear."

List of Patents granted in Scotland, 1825.

Jan. 1, 1825, for improved Portable Gas Lamps. To David Gordon, London.

Jan. 17, for Improvements in Steam Engines. To W. Foreman, Bath.

Jan. 17, for Improved Looms, &c. To T. W. Stansfeld, Leeds.

For Improved Ship's Tackle. To W. S. Burnett, London.

Feb. 9, for Improved Carriages, &c. To David Gordon, London.

Feb. 10, for Improvements in Propelling Vessels. To Lieut. W. H. Hill, Royal Artillery.

Feb. 14, for Improved Paper Machinery. To J. and C. Phipps.

Feb. 21, for Diaphane Stuffs, communicated by a foreigner. To S. Wilson, Streatham.

Feb. 22, for a New Method of Applying Heat. To J. Surrey, Battersea.

March 5, for Improvements in the Manufacture of Silk, &c. To R. Badnall, Leek.

March 7, for an Apparatus for Bottling Liquids. To Thomas Masterman, London.

March 7, for an Improved Method of Corking Bottles. To John Masterman, London.

March 11, for a New Composition of Malt and Hops. To George Augustus Lamb, Sussex.

March 11, for an Improved Method of Generating Steam. To John Maccurdy, Middlesex.

March 12, for a New Method or Methods of Making or Manufacturing Hats, Bonnets, and Caps. To Patrick Mackay and Thomas Cunningham, Edinburgh.

March 95, for Improvements in the Art of Dyeing and Calico Printing, &c. To James Hanmer, Middlesex.

March 25, for an Apparatus for giving Motion to Vessels employed in Inland Navigation. To Samuel Brown, Middlesex.

April 5, for Improvements applicable to the Mule Billy Jenny Stretching Frame, &c. To Richard Roberts, of Manchester, Lancaster.

April 5, for Improvements on Square Piano Fortes. To Francis Melville of Argyle-street, Glasgow.

April 13, for Improvements in the Construction of Forges, &c. To William Halley, Surrey.

April 13, for a New Step or Steps, to ascend and descend Coaches and other Carriages. To Ross Corbett, Glasgow.

April 27, for a New Method of Constructing a Roasting Jack. To John Thin, Edinburgh.

May 3, for Improvements in the Construction of Apparatus for Distilling Spirituous Liquors. To William Grimble, Middlesex.

May 13, for Improvements in Machinery for Hackling, &c. To Edward Garseed of Leeds, York.

May 17, for a New Process for making Steel. To Charles Mackintosh, Lanark.

May 25, for certain Improvements in manufacturing Tubes for Gas, and other Purposes. To Cornelius Whitehouse, Stafford.

New Patents Sealed, 1825.

To Jean Jacques Saintmarc, of Belmont Distillery, Wandsworth Road, Vauxhall, in the parish of Saint Mary, Lambeth, in the county of Surry, distiller, for his new invented improvements in the process of, and apparatus for distilling.—Sealed 28th June—6 months.

To David Redmund, of Agnes Circus, Old Street Road, in the county of Middlesex, engineer, for his invention of certain improvements in building or constructing ships, houses, and other buildings.—Sealed 28th June—6 months.

To George Tompson, of Wolverhampton, in the county of Stafford, gentleman, for his invention of improvements in the construction of riding Saddles.—Sealed 28th June—6 months.

To John Heathcoat, of Tiverton, in the county of Devon, lace manufacturer, for his invention of certain improvements in the method of manufacturing of thrown silk.—Sealed 6th July—6 months.

To William Heycock, woollen cloth manufacturer, of Leeds, in the county of York, for his invention of certain improvements in machinery, for dressing and finishing of cloth.—Sealed 8th July—6 months.

To John Biddle, of the parish of Donnington, in the county of Salop, glass manufacturer, for his new invented machine, or combination of machinery, for making, repairing, and cleansing roads and paths, which machine or parts of which machinery, is or are applicable, to these and other useful purposes.—Sealed 8th July—6 months.

To Molyneaux Shuldham, of Brampton Hall, Wrangford, in the county of Suffolk, lieutenant in the royal navy, for his invention of certain improvements, for the purpose of

setting, working, reefing, and furling the sails of boats, ships, and other vessels.—8th July—2 months.

To William Furnival, and John Craig, both of Anderton, in the county of Chester, salt manufacturers, for their invention of certain improvements in the manufacturing of salt.—8th July—6 months.

To John Day, of the Town of Nottingham, lace Manufacturer, and Samuel Hall, of the same place, lace manufacturer, for their new invented improvements on a pusher, twist, or bobbin net machine.—8th July—2 months.

To Walter Hancock, of King Street, Northampton Square, in the county of Middlesex, jeweller, for his invention of an improvement or improvements in the making or constructing of pipes or tubes, for the passage or conveyance of fluids.—16th July—6 months.

To William Hurst, manufacturer, and Henry Hurst, manufacturer, both of Leeds, in the county of York, for their invention of certain improvements in the art of scribbling and carding sheeps wool.—16th July—6 months.

To Henry Hurst, manufacturer, and George Bradley, machine maker, both of Leeds, in the county of York, for their invention of certain improvements in the construction of looms for weaving woollen cloths.—16th July—6 months.

To Thomas Wolrich Stansfeld, merchant, William Pritchard, civil engineer, and Samuel Wilkinson, merchant, all of Leeds, in the county of York, for their new invented improvements in looms, and in the implements connected therewith.—Sealed 16th July—6 months.

To Thomas Musselwhite, of Devizes, in the county of Wilts, saddler and harness maker, for his invention of certain improvements in the manufacture or construction of collars for horses, or other animals.—Sealed 16th July—2 months.

To Marc Isambard Brunel, of Bridge Street, Blackfriars, in the City of London, Esq., for his invention of certain mechanical arrangements, for obtaining powers from certain fluids, and for applying the same to various useful purposes. —Sealed 16th July—6 months.

To Thomas Sitlinton, of Stanley Mills, in the county of Gloucester, engineer, for his invention of certain improvements in machinery for shearing or cropping woollen or other cloths.—Sealed 16th July—6 months.

To Joseph Farey, of Lincolns Inn Fields, in the county of Middlesex, civil engineer, for his invention of improvements in lamps.—Sealed 16th July—6 months.

To Thomas Robinson Williams, of Norfolk Street, Strand, in the county of Middlesex, gentleman, being one of the people called Quakers, for his invention of an improved lancet.—Sealed 16th July—6 months.

To Thomas Gook, of Upper Sussex Place, Kent Road, in the county of Surrey, lieutenant in the royal navy, for his invention of improvements in the construction of carriages, and harness to be used therewith, whereby greater safety to the persons riding in such carriages, and other advantages will be obtained.—Sealed 16th July—6 months.

To Joseph Chesseborough Dyer, of Manchester, in the county of Lancaster, merchant, in consequence of a communication made to him, by a certain foreigner residing abroad, for a certain invention, of a method of conducting to and winding upon spools or bobbins, rovings of cotton, flax, wool, or other fibrous substances.—Sealed 16th July —6 months.

To William Hurst, Gentleman, and Joseph Carter, cotton spinner, both of Leeds, in the county of York, for their invention of apparatus, for giving a new motion to mules and billies.—Sealed 16th July—6 months.

To John Palmer De la Fons, of George Street, Hanover

Square, dentist, for his invention of an instrument for extracting, and method of fixing teeth.—Sealed 16th July.—6 months.

To Jonathan Downton, of Blackwall, in the county of Middlesex, shipwright, for his invention of certain improvements on machines or pumps.—Sealed 19th July—6 months.

CELESTIAL PHENOMENA, FOR AUGUST, 1825.

D.	H.	M.	S.	
3	14	0	0	☿ in conj. with ζ in Leo.
6	12	14	0	☾ in □ last quarter.
6	21	0	0	☾ in conj. with δ in Aries.
7	22	0	0	☾ in conj. with A in Taurus.
8	7	0	0	☾ in conj. with 2 η in Tau.
9	8	0	0	☾ in conj. with ♄ long. 14° in Gemini, ☾ lat 15′ N. ♄ lat. 1. 28 S. diff. lat. 1° 43′.
10	5	0	0	☾ in conj. with η in Gem.
10	8	0	0	☾ in conj. with ♀ long 32° in Gemin. ☾ lat. 1 8′ S. ♀ lat. 2 47′. S. diff. lat. 1 39′.
10	9	0	0	☾ in conj. with μ in Gemini.
11	2	0	0	☾ in conj with ζ in Gem.
12	0	0	0	♀ in conj. with ν in Gem.
13	2	0	0	☾ in conj. with 2α in Cancer.
13	18	58	0	Ecliptic Conjunction or ● New Moon.
15	6	0	0	☿ in conj. with τ in Leo.
17	15	0	0	☿ in conj. with υ in Leo.
17	23	0	0	☽ in conj. with i in Virgo.
19	19	0	0	♀ in conj with ζ in Gemini.
20	9	33	0	☽ in □ first quarter.
20	14	0	0	☽ in conj with δ in Scorpio.
22	1	0	0	☽ in conj. with B in Oph.
23	0	4	0	☉ enters Virgo.
23	19	0	0	☽ in conj. with o in Sag.
23	22	0	0	☽ in conj. with π in Sag.
24	1	0	0	☽ in conj. with d in Sag.
25	7	0	0	☽ in conj. with β in Cap.
25	7	0	0	♂ in conj. with δ in Cancer.
28	0	0	0	Ecliptic opposition or ○ full moon.
29	18	0	0	♃ in conj. with a in Leo.

The waxing moon ☽ —, the waning moon ☾

Rotherhithe. J. LEWTHWAITE.

METEOROLOGICAL JOURNAL, June and July, 1825.

1825.	Thermo.		Barometer		Rain in inches.	1825.	Thermo.		Barometer.		Rain in inches.
	Higt.	Low.	+	—			Higt.	Low.	+	—	
June						July.					
9	73	46	30,05	30,00		2	70	40	30,10	30,03	,025
10	76	43	30,15	Station		3	72	42	—,10	—,08	
11	78	44,5	30,19	30,16		4	74	52	—,14	—,09	
12	83	44	30,14	—,10		5	70	50	—,23	—,20	
13	82	47	—,16	—,10		6	64	54	—,08	—,02	
14	78	52	—,26	—,20		7	62	47	—,00	Station	
15	75	47	—,26	—,24		8	67	53	29,95	Station	
16	80	44	—,18	Station		9	69	51	—,96	Station	,125
17	71	46	—,15	30,12		10	72	45	—,94	29,90	
18	70	37	—,14	—,10		11	76	49	—,92	—,90	
19	69	39	—,05	29,88		12	80	45	—,95	Station	
20	66	48	29,75	—,72		13	82	55	30,03	Station	
21	63	37	—,90	—,80		14	82	55	—,10	30,08	
22	69	34	30,00	—,96		15	90,5	53	—,00	Station	
23	72	42	—,02	30,00		16	87	55	—,19	30,10	
24	75	38	—,00	29,94		17	84	54	—,23	—,20	
25	75	42	29,88	—,65		18	90	53	—,16	—,15	
26	69	43	—,76	—,70		19	91*	61	—,20	—,15	
27	62	40	—,80	—,76	,125	20	82,5	54	—,22	—,20	
28	62	47	—,80	—,67	,3	21	71	53	—,20	—,18	
29	68	45	—,70	—,69	,6	22	73	44	—,17	—,16	
30	68	51	—,70	—,68		23	67	46	—,00	29,98	
July			July			24	70	44	—,14	30,03	
1	66	46	29,85	29,70		25	75	38,5†	—,22	—,20	0125

* This unusual state of the thermometer, has it is believed, only been exceeded twice in Great Britain; viz. on the 16th of July, 1793, and on the 24th of July, 1818, on which it stood at ninety-three. The consequence of this excessive heat is an early harvest, several having cut, and some even carted their corn; it is the opinion of farmers that the season in general is about one month earlier. Many of the trees and hedges have quite an autumnal appearance.

† This extraordinary and sudden difference of temperature in so short a time, is worthy a particular remark.

CHARLES H. ADAMS, LOWER EDMONTON.

LITERARY AND SCIENTIFIC NOTICES.

Painting by Correggio.—The painting of the "Holy Family" by this celebrated artist, has been obtained at the expence of £3800, to enrich our National Gallery. This perfect specimen of the master, one of the few of his works which can be authenticated, once belonged to the King of Spain, and was taken from him by the French under Bonaparte. From Spain it found its way to Rome, where it was in the possession of Mr. Wallace, and some years ago was in this country. It afterwards got to Paris, becoming the property of Pelletier, the banker, at whose sale it was finally procured, to adorn the National Gallery of England.

Africa.—Major Laing has sailed for Tripoli, whence he designs to travel to Timbuctoo, and explore the Niger.

Fire Engine.—Report says, that a new fire engine has been invented at Berne, by a mechanic of the name of Schenk, which is said to possess much greater power, and is to be worked with much more facility than any machine heretofore invented for this purpose. Its force is so extraordinary, that the column of water it sends out will, at a distance of 100 feet, untile the houses, and demolish their masonry up to the second floor.

In the press, to be dedicated to the Right Hon. the Lord Mayor, "Chronicles of London Bridge;" comprising a complete history of that ancient structure, from its earliest mention in the British annals, traced through all its various destructions, re-erections, and numerous alterations, down to the laying the first stone of the new edifice, June 15, 1825. Compiled from the most authentic histories, MSS. records, original drawings, rare prints, and books and official papers: the work is to be printed in one thick octavo volume, and embellished with numerous highly finished wood engravings.

The Life, Diary, and Correspondence of Sir W. Dugdale is preparing for publication, by W. Hanaper, Esq.

The King of France gave orders on December 22, 1824, for a new bridge to be erected over the Rhone, near the town of Lyons. This bridge will bear the name of Charles the Tenth.

China.—M. Timkowski, one of the principal members of the oriental department of the ministry for foreign affairs at St. Petersburgh, having been employed in the years 1820 and 1821, to conduct from Kiachta to Pekin the Russian ecclesiastical mission sent to the great monastery which Russia has at Pekin, and to bring from Pekin to Kiachta the priests who were leaving the latter place, kept an exact journal of his travels, full of historical, geographical, and statistical notes, which, illustrated by maps and plates, he has recently published in two volumes. It is a work that contains an abundance of curious and interesting information.

Astronomy.—Sir Thomas Brisbane's New Catalogue of the Stars in the southern hemisphere, is making very rapid progress. Sometime since, twelve thousand observations were about to be sent home finished, and six thousand more were in rapid progress.

The Emperor of Russia has granted fifty thousand rubles per annum, to be distributed among the Russian artists studying at Rome.

New Bees.—The Horticultural Society has lately received from New South Wales, through the liberality of Captain M'Arthur, son of John M'Arthur, Esq. of Camden, in that colony, a fine healthy hive of native bees, differing materially from the bees of Europe, being of a smaller species, and wholly without stings. The honey they produce is said to be of excellent quality, and is distinguished by a peculiar fragrance; it is one of the few products of that singular country which serves as food for the natives.

A commission has been nominated to investigate the MSS. in the State Paper Office. Mr. Lemon, the indefatigable Deputy Keeper, is appointed Secretary.

LONDON:
SHACKELL AND ARROWSMITH, JOHNSON'S-COURT, FLEET-STREET.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. LVIII.

Recent Patents.

To JOHN VALLANCE, *of Brighton, in the County of Sussex, Esq. for his New Invented Method of Communication, or Means of Intercourse, by which Persons may be conveyed, Goods transported, or Intelligence communicated from one Place to another with greater Expedition than by Means of Steam Carriages, or other Vessels or Carriages drawn by Animals.*

[Sealed 19th February, 1824.]

AMONG the many imaginary projects by which the inventive talents of Mr. Vallance have acquired a certain degree of celebrity, the subject of the present patent must be considered as the most extraordinary. It is proposed to construct hollow cylinders of cast iron, sufficiently large to allow carriages with passengers and

goods to pass through them; a series of these cylinders are to be united and extend from town to town, the junctions being made sufficiently air-tight to allow of a vacuum being produced within, and the carriages formed to the figure and dimensions of the cylindrical trunk are to be projected from place to place by the pressure of the atmosphere rushing forward to occupy the vacuum.

These trunks being formed by a series of iron cylinders, about six feet in diameter and twelve feet long, with their ends slightly tapering in order to fit together and allow of the expansion and contraction of the metal, the junctions are to be bound round with rolls of flannel, coated with tallow, and an external hoop to keep the joints air-tight. The cylinders are to be supported upon blocks of masonry or brick-work, and where it becomes necessary to deviate from a straight line or from a horizontal position, the inclination must be made as gradual as possible. In this way trunks are to be formed extending from station to station, and may be carried over rivers by means of bridges, or through hills, if necessary, by means of excavations; and air pumps of very large dimensions are to be constructed at each end of the trunk, for the purpose of exhausting the air within.

The carriages intended to be employed in these trunks for the transportation of goods, (and we suppose passengers also, but that is not named) is shewn in perspective in Plate V. fig. 1. It consists of two straight top and bottom rails, *a*, *a*, and the upright standards, *b*, *b*, to which rails a series of hoops, *c*, *c*, *c*, are affixed, forming the skeleton of the vehicle, and to the ends circular doors, *d*, *d*, are attached, which open by turning upon the pivots of perpendicular rods extending from top to bottom; *e*, is the wheel upon which the carriage runs,

there being a channel or groove in the lower part of the trunk to receive it. The axle of this wheel turns in blocks, *f*, which slide up and down on the standards, *b*; these blocks are attached to rods, *g*, and have pistons at their upper extremities working in the condensed air cylinders, *h*; the intention of this contrivance is, that the carriage which is supported by the pistons in the condensed air cylinders may run upon elastic bearings. An air pump is to be placed in some convenient part of the vehicle with a pipe extending to the cylinders for the purpose of forcing air into them above the pistons, which being very considerably condensed, will give an elastic pressure to the pistons and cause the rods, *g*, to force the boxes, *f*, and the wheel, *e*, downwards; by these means it will be seen that the carriage rides upon the elastic condensed air in the cylinder, *h*, which, acting as springs to the carriage, will dissipate the effects of any slight temporary obstruction or concussion to which it might be subject by its rapid motion through the trunk.

The hoops, *c*, *c*, *c*, that form the outside of the carriage, are made two or three inches smaller in diameter than the interior of the trunk; and to avoid the friction that would arise from their rubbing against the trunk, small rollers are placed on the edges of the hoops at the top and at the sides, which also as the wheel, *e*, runs in the groove or channel in the lower part of the trunk, keeps the carriage in an erect position.

The cylinders that form the trunk being arranged as above described, the carriage, fig. 1, is to be introduced, and when loaded with goods, the doors, *d*, are to be shut in order that the external air in exerting its pressure against the closed end of the carriage may impel it forward through the trunk. The air pump placed at the

farther extremity of the trunk is now to be put in action for the purpose of exhausting the air from the interior; and when that has been effected to a sufficient extent, the carriage is let go, and the force of the air from the open end of the trunk acting against the end of the carriage, drives it forward with a velocity proportionate to the degree of exhaustion within.

When the exhaustion is such as shall exhibit a difference of two inches in barometrical pressure between the interior of the trunk and the open air, the force exerted upon the end of the carriage to impel it forward will be equal to about one pound upon every square inch of its surface. Supposing the trunk to be six feet in diameter, the impelling force would then be equal to four thousand pounds, and the velocity with which the carriage would move forward about two hundred miles per hour. This velocity might be increased or diminished by a greater or less degree of exhaustion produced in the trunk, but the speed could not, (the inventor thinks,) be conveniently carried beyond one thousand miles per hour, as that is the rate of velocity with which air rushes into a vacuum. This matter is argued in the specification upon philosophical principles at considerable length, but we presume enough has been explained to shew the patentee's views.

In order to avoid any retardation of the carriage by the friction which the air would experience in passing along the sides of the trunk, it is proposed to have air valves opening into the trunk at about every mile of its length, which valves are to be rendered air-tight by mercurial joints; and as the carriage passes the valve, a small lever is to open it and allow the air to rush in. It is intended that the interior of the trunk should be marked at every mile, and lighted lamps are to be

attached to the carriage, that the conductor may know where about he is on the journey. A lever also is to be connected to the carriage under the command of the conductor, by pressing upon which he may produce a friction sufficient to stop the carriage.

There may be several air pumps placed at the extremities of the trunks, or at the places of rest, which shall be made to act in unison; and as there are pistons of very large diameters employed as bellows in some of the smelting works about the kingdom, the patentee considers that there will be no difficulty found in constructing air pumps of such dimensions as shall be fully adequate to the task of pumping the air from these trunks, even supposing the resting places to be ten or twenty miles apart. These pumps are to be kept working all the time that the carriages are in progress, in order to preserve the state of exhaustion as nearly as possible, and to draw out the air which may find its way into the trunk by passing between the carriage and the cylinder. When the natural pressure of the air is found insufficient to propel the carriage in the trunk with the desired velocity, the air pump at the posterior end of the trunk is to be employed in injecting air behind the carriage so as to produce a pleneum, while the pump at the reverse end is exhausting to produce the vacuum, so that the air pumps at the ends of the trunk are to aid each other.

In order to convey intelligence from one place to another, particularly for the purpose of giving notice when the pumps are to be put in action, to impel the carriages through the trunks as above described, a contrivance is proposed, consisting of a long series of pipes extending from the starting place to the station of the next air pump. The ends of these pipes are to be

securely attached together and rendered air and water tight throughout the whole length in the manner usually adopted for that purpose. It is proposed to place this length of pipe in a trench some feet under ground, and to cover it, so as to prevent any variation of temperature in the atmosphere from effecting the fluid within. This pipe is to be filled from end to end with water or some other non-elastic fluid, and at each extremity a branch pipe is to be connected similar to that shewn at fig. 2.

One end of this long pipe, which has been completely filled with water as above said, may be supposed to be represented at *a*, from which the branch, *b*, extends, its aperture being closed by a rod or piston; *c.*—*d*, is a similar portion of pipe to *b*, filled with water, and into which the piston or rod, *c*, also passes; at the end of this pipe there is an air vessel, *e*, containing a volume of condensed air, which air pressing upon the water in the pipe, *d*, forces it and the piston, *c*, backward, while the condensed air in a similar vessel, having a piston in a branch pipe at the reverse extremity of the long pipe first described, acts in a contrary direction, that is, forces the piston forward. The adjustments of these pressures at the two extremities of the pipe must be attended to with great care, and also the quantity of water in the long pipe, for it is necessary that the pistons, *c*, at each end of the pipe should be so uniformly pressed, that their ends may stand equal distances up the branch pipes, *b* and *d*, which will be known by the index, *f*, standing midway between the two.

It will now be perceived that if the piston, *c*, with its index, should be sliden along in its branch pipes, *b* and *d*, the non-elastic fluid in the main pipe would slide also, and consequently whatever distance the piston and index, *f*, is removed from its central situation, the piston and

index at the reverse extremity of the long pipe will be moved also. Now, if a series of letters, words, sentences, or other signs be placed in a row above the index, it is obvious that by moving the index at one station to a certain letter, word, or sentence, that the index at the distant station would point to the same letter, word, or sentence, and hence a signal or message might be instantly communicated from one station to the other, as for instance, "the carriage is nearly ready to start, put the pumps in action."

This contrivance is proposed to be also employed for telegraphic communication from one place to another at a distance, or for domestic communication from room to room in a dwelling house, to which it might be conveniently adapted by certain modifications; these however it will be unnecessary to describe here, or to enlarge upon the philosophical principles and theorems which this contrivance involves; we therefore refer those of our readers who are not fully satisfied with the above sketch of the invention, to the elaborate specification itself, which occupies sixteen and a half closely written skins of parchment.

[*Inrolled, August*, 1824.]

To Joseph Cliseld Daniell, *of Stoke, in the County of Wilts, Clothier, for his Invented, or New Improved Method of Weaving Woollen Cloth.*

[Sealed 7th July, 1824.]

These improvements apply to *power looms* of the description employed for weaving woollen cloths, that is, such looms as are actuated by the power of steam or water, in distinction from those worked by hand labour.

The principal novel features consist in the introduction of a spring behind the lathe or batten, to which the crank rod is attached that causes the lathe to vibrate; the employment of a weighted lever which tumbles to and fro on the treddle shaft, for the purpose of throwing the warp open to receive the shuttle; and the introduction of oblique brushes or card-rollers in the breast-beam, in order to stretch the cloth out towards the sides and prevent its wrinkling on the work beam as it rolls up.

Plate VI. fig. 1, represents an end view of the loom; *a*, is the lathe or batten containing the reed and the shuttle race as usual, *b* is the spring above mentioned, which is bolted to the lower part of the lathe; *c*, is the crank rod attached to the top of the spring and to the crank on the rotatory shaft, *d*, by the revolution of which, the lathe is made to vibrate. Let it be supposed that the shuttle has just passed across the loom, and deposited the shoot between the open warps, and that the lathe has been brought forward as represented in the figure, for the purpose of beating up the weft or shoot; the reed will have driven up the shoot before the crank has reached its extent, consequently the spring *b*, must be pressed back in allowing the crank to pass; this gives time for the threads of the warp to close upon the shoot and open again before the reed has retired, hence the shoot or weft thread is not permitted to slip back as in ordinary weaving, and the warp constantly closing upon and confining the weft, produces a cloth more compactly woven than has before been made.

The lathe in retiring reaches its back position, and is there stopped by a rest, *e*, before the crank has arrived at its extent; in the same way therefore as before described, the spring *b*, is brought into action, and this resting of the lathe allows time for passing the shuttle

without that sudden jerk which is given to it in other looms, either by hand or by a projector, to the very great risk of breaking the threads.

Upon the axle, *d*, there is a toothed wheel, which takes into another toothed wheel upon the axle, *o*, and thereby actuates that axle; also upon the axle, *o*, there are either arms or tappets, *f f*, which, as the axle revolves alternately, strike upon one of the treadles, *g g*, and depress it, the other treadle rising at the same time. To the ends of these treadles cords are attached, leading from the lower parts of the leashes, *h*, and also from the upper part of the leashes cords pass over roller pullies, *i*, and thereby connect the two leashes together; hence it will be perceived, that as one treadle descends and carries down one of the leashes with it, the other leash rises and its treadle also, which action of the leashes causes the warp threads to pass each other and open. It is, however, desirable that the opening or changing of the warp should be performed quickly, in order that there may be time allowed for the shuttle to pass without danger to the threads; to facilitate the passage of the leashes therefore, and keep the warp open, a weighted lever, *k*, is attached to the axle of the pullies roller, *i*, and vibrates with it, which weighted lever, as soon as it has passed the perpendicular, falls over with considerable force on one of the rests, *l l*, and instantly draws up the leash on the opposite side.

In the breast beam, *m*, there are two carded or brush rollers placed, so as to take hold of the cloth as it proceeds to the work beam, *n*; these rollers stand a little inclined from the parallel edges of the beam, and by that means as the cloth passes over them, they draw it in lateral directions outwards, and distend its surface so as to prevent any wrinkling or

plaiting of the cloth upon the work beam as it rolls up.

There are many parts of a loom necessarily shewn which are not new, and those which are new may be otherwise contrived, it is therefore to be observed, that the patentee's claims are comprised under the following heads; in bringing the shuttle through the warp gradually and without a jerk—in continuing the pressure of the reed against the shoot while the position of the warp changes—in enabling the lathe to be at rest when the shuttle passes—in assisting the changing of the warp, and keeping it open by a tumbling weight, and lastly in a means of stretching the cloth in its width as it rolls on to the work beam.

[*Inrolled, September,* 1824.]

To JOHN CHRISTIE, *of Mark Lane, in the City of London, Merchant, and* THOMAS HARPER, *of Tamworth, in the County of Stafford, Merchant, for their Invention of an improved method of combining and applying certain Kinds of Fuel.*

[Sealed, 12th February, 1824.]

THIS invention is the combination of bituminous coal, with stone, coal, culm, and anthracite, in such proportions as will burn in furnaces and kilns without emitting smoke. The proportions of the materials combined must necessarily depend upon their qualities, and the draft of the fire-place. The quantities of each may be considered generally as varying from one-fifth to one-third bituminous coal, and the remainder *stone*-coal, culm, or anthracite; the intention of the patentees being

to use only so much bituminous coal in the mixture, as may be found necessary to keep up a fire suitable for the various processes to which it may be applied in our manufactories, without giving out smoke.

The inferior kinds of coal, such as stone-coal, culm, and anthracite, when in a state of combustion give out little or no flame or smoke, though they become heated to redness, it is therefore only necessary to add so much bituminous coal as will stimulate or invigorate the other coal and keep it burning. The patentees have found upon trial, that one quarter of bituminous coal is a good proportion, when the bars of the furnace are one inch wide, and half an inch asunder, there being a good draft. Stone coal may be employed, or mixed with culm, in the proportions of one half of each, and this mixed as above, and applied to furnaces, will burn without emitting smoke; it is particularly applicable to hot air stoves, and to mix with cinders or brees for the burning of bricks.

Inrolled, August, 1824.

To Samuel Hall, *of Basford, in the County of Nottingham, Cotton Manufacturer, for his Invention of an Improved Steam Engine.*

[Sealed, 8th April, 1824.]

This is an apparatus to be connected to a steam engine of the kind usually denominated high pressure, and is intended to produce a highly rarefied vapour, by passing steam through a furnace; which steam, the patentee considers, will become decomposed and converted into

elastic gases of several kinds, according to the qualities of the fuel employed in the furnace; and the operation may be assisted by the introduction of other materials with the fuel, such as oxides of metals, or any matter that will give out oxygen, thereby promoting the combustion.

The patentee states, that the object of his invention is to diminish the quantity of fuel required at present in working steam engines, (even of the best construction) and thereby to enable those persons who employ steam engines, to produce the power required, at less expense of fuel. His method of effecting this, is by decomposing the steam, more or less completely, in its passage from the boiler to the working cylinder, under a pressure superior to that of the atmosphere. The gases or elastic fluids thus generated, occupy a greater space at any given pressure and temperature, than the steam does, by means of which they are produced, and being for the most part permanently elastic fluids, they possess the additional advantage of being capable of use at a temperature not higher than that of the atmosphere, if required.

The proposed construction of an apparatus of this kind will be seen in Plate VI. fig. 2. which is a vertical view, shewn partly in section and fig. 3, an horizontal view of the same parts. This is not, however, to be considered as the definite form of the apparatus, to which the patentee limits his claim of invention, but as a convenient method of bringing the principles by him combined into action; it is therefore capable of considerable variation. In the plate here shewn, *a* represents a hollow cylindrical vessel, placed in a vertical position, which is to contain the furnace; this is surrounded by another cylinder, *b b*, forming a jacket; the fire is to be placed in the hopper formed grate, *c*, and the jacket, *b*,

is to be occupied as a steam-boiler with water. The furnace must be fed with fuel at the aperture, *d*, above, and the dust and clinkers discharged at the aperture, *e*, below. These apertures are, however, both furnished with stop-cocks, for the purpose of shutting up the cylinder, *a*, and rendering it perfectly air-tight in those directions. The small aperture and pipe, *f*, is for the passage of a strong current of air to the furnace, from bellows or other blowing machinery, which, when the aperture, *d*, is open, may be employed to keep the fuel in the grate, in a lively state of ignition; this wind-pipe is to be closed by a stop-cock when not in use.

The heat of the furnace will cause the water contained between the jacket, *b*, and the cylinder, *a*, to boil, and the steam emitted from it will pass through the pipe, *g*, when its stop-cock is open, and proceed down into the furnace, which is now closed air-tight. The steam will then pass through the fire, and in doing so become highly rarefied, and partially decomposed, and for the most part converted into permanently elastic gas, which proceeding from the furnace, through the aperture and pipe, *h*, will be conducted into the receiver or chamber, *i*, and from this chamber pass by suitable pipes to the working cylinder of the steam engine.

The boiler is supplied with water from the reservoir, *k*, from whence it flows through a pipe, *l*, and stands at the same level in the boiler as in the reservoir. A forcing pump connected to the engine may be employed to inject water into the reservoir, which must be made strong and air-tight. One reservoir will be sufficient to supply two boilers, upon the construction above described; therefore, the left-hand cylinder, *m*, may be considered the same in every particular, as that shewn in section on the right-hand of the figure. One receiver

or chamber for the steam or gas will also be sufficient, and may be conveniently disposed, as in the horizontal view, fig. 3. The combination of at least two furnaces and boilers will be necessary, in order to keep up a constant supply of the elastic vapours; and the whole may be conveniently attached to a bed or foundation plate, and erected upon legs.

In putting this apparatus to work, the reservoir, *k*, and boiler, *b*, must be first occupied with water, nearly to the top, its height being regulated by a float, as usual, and the communication between the reservoir, *k*, and receiver, *i*, free, for the steam to pass into both by the pipe, *n*; the large cocks, *d* and *e*, at top and bottom of the furnace, are also to be opened, and red-hot coke, charcoal, or other ignited fuel introduced, the bellows are to be put in action, and the fuel supplied from time to time until the furnace is full, and the fuel in a state of vivid combustion throughout the whole. By these means the water in the boiler will become hot, and when the steam has acquired a sufficient force, which is indicated by a safety valve, the stop-cocks at top and bottom of the furnace, are closed, also the blast pipe, and the communication, *n*, between the reservoir and receiver; the steam is then permitted to pass down the pipe, *g*, into the furnace, and after becoming rarefied and decomposed, by passing through the fire as described, it then proceeds by the pipe, *h*, to the receiver.

When the passage of the steam has cooled the fire down, so as to render it no longer capable of producing the effect, the stop-cock in the pipe, *h*, is to be closed, and the other cocks opened, the blowing machine set to work, a fresh supply of fuel introduced, and the fire raised as before. While this is going on, the other boiler and furnace, *m*, is prepared, ready to be put in action, and

thus a continued supply of steam, or gaseous vapours, are constantly generated, and conveyed into the receiving chamber, from whence the working cylinder of the engine is to be supplied.

The patentee concludes by saying, "the apparatus above described, appears to me to be the best calculated to answer its intended purpose, and although I do not claim the parts of the apparatus taken separately, yet I do claim the exclusive use of them, when combined or connected together, for the purpose above described. The principle being once pointed out as above, of obtaining mechanical power by means of the decomposition of steam, many modifications of apparatus for this purpose will present themselves to the mind of a mechanic; of all such, however, as depend upon the application of the same mechanical and chemical principles as those applied by me, and described in the foregoing part of my specification, I claim the exclusive use."

Inrolled, October, 1824.

To Louis Lambert, *of Rue de la Gout, in the City of Paris, in the Kingdom of France, but now residing in Cannon-street, in the City of London, Gentleman, for his Invention of certain Improvements in the Material and Manufacture of Paper.*

[Sealed, 23d November, 1824.]

These improvements consist in reducing straw into pulp suitable for making paper, and in extracting the colouring or other matter therefrom. The method is

this, first to procure a quantity of straw and cut away all the knots, (any particular kind of straw is not mentioned,) the straw is then boiled with quick lime in water, for the purpose of extracting the colouring matter and separating its fibres.! Caustic potash, soda, or ammonia may be employed for this purpose, instead of lime. When this is done, it is to be washed in clean water in order to remove the colour that has been extracted, and also the slaked lime. The fibrous substance is then submitted to the action of a hydro-sulphuret, composed of quick lime and sulphur in solution, in the proportion of four ounces of quick lime to one of sulphur, with one quart of water, in order to get rid of the mucilaginous and silicious matters. After this the fibrous material must be thoroughly washed in successive waters, until all the alkaline matters are removed, and there is no smell of the sulphur left; this may be done by beating in a paper mill, or by any other economical means; it is then pressed to extract the waters from the fibres, and bleached in the ordinary way, either with chlorine, or with lime, or by exposure to the light and air, upon a grass plat.

The bleaching process having been completed, the material is again washed until all chemical matters are entirely removed from it, when it is considered fit to be introduced to the ordinary rag engine, employed in making paper, for the purpose of reducing it to pulp previously to moulding it into sheets.

[*Inrolled, May,* 1825.]

A patent was granted in 1801 to Matthias Koops, under the following title, "for manufacturing paper from straw, hay, thistles, waste and refuse hemp and

flax, and different kinds of wood and bark fit for printing."

The process described in the specification of this patent, as respects the first mentioned material, is to cut the straw into pieces of about two inches long by means of a chaff-cutting apparatus, and then to boil it with lime in water; and after having washed all the lime away and left the fibre clean, to bleach it and convert it into pulp for making paper by any of the usual modes. —EDITOR.

To CHARLES RANDOM BARON DE BERENGER, *of Target Cottage, Kentish Town, in the Parish of St. Pancras, and County of Middlesex, for his Discovery and Invention of certain Improvements as to a New Method or Methods of applying Percussion to the purpose of Igniting Charges in Fire-arms generally, and in a Novel and Peculiar manner, whereby a Reduction of the Priming is also effectually protected against the Influence of Rain or other Moisture. Such Invention and Contrivances, rendering the Percussion Principle more generally applicable even to common Pistols, Blunderbusses, and Muskets, as well as to all sorts of Sporting and other Guns, by greatly reducing not only the Charges of their Manufacture, but also those impeding circumstances which Persons have to encounter while loading or discharging Fire-arms when in Darkness, or whilst exposed to Wet, or during rapid Progress; serious Impediments to Soldiers and Sailors, and consequently to the Service, and most injuriously expensive.*

[Sealed, July 27, 1824.]

THE object of the patentee, is to dispense with the greater part of the mechanism of an ordinary gun-lock,

such as the tumblers, sear, and minor springs, and to employ a main spring only, which with the assistance of a lever, in the manner about to be explained, he considers will be as completely efficacious in the discharge of percussion guns, as the more complicated locks at present in use, and by no means as expensive. The principles of the invention may be adapted in various ways, one of which the patentee has exhibited, (see Plate V.) for the sake of illustration.

Fig. 3. is a section of part of a gun, cut lengthways through the barrel and stock; fig. 4. is a cross section of the same, shewing a back view of the operating parts of the lock. The letters of reference apply to the same parts in both figures; *a*, is the barrel, *b*, what is commonly called a patent breach, having a concave chamber, for the reception of the charge of gun-powder. At the back part of the chamber there is a conical recess, and a small aperture through the breach to the touch-hole, *c*, behind; *d*, is a box or magazine, containing the detonating powder for priming, which box slides to and fro in a lateral direction, upon a centre pin; *e*, is the main-spring, in which the plug is fixed that strikes into the touch-hole and discharges the piece.

The main-spring is attached to a lever, *f*, and by pushing forward that lever, the spring is drawn back, as shewn in fig. 3. when a small pin, *g*, which extends from the lower part of the lever, stops against a spring catch, *h*, and keeps the main-spring in a state of tension; *i*, is the trigger, which being drawn back by the finger, as in the usual way of discharging guns, presses down the spring-catch, *h*, and liberates the lever, *f*, when the force of the main-spring carrying it forward, causes the plug, *m*, to strike into the touch-hole, *c*, and discharge the piece.

In re-priming, the lever, *k*, attached to the tail of the

magazine, *d*, is to be pressed inwards, which will bring the aperture in front of the magazine opposite to the touch-hole, when a sufficient quantity of detonating powder for priming the piece will pass into the touch-hole, and the magazine return to its former position as in fig 4, by the force of the small side spring, *e*, which spring carries a piece of metal, that covers the aperture of the magazine, when at rest, for the purpose of keeping in the powder, but is displaced by coming against the back of the breach, as the magazine is brought up to the priming position.

A small finger-screw, *n*, closes an aperture at the top of the magazine, *d*, at which aperture the detonating powder is to be introduced to the chamber, and the lower part of the lever, *f*, is made to turn up, upon a spring joint against the outside of the guard, in order that the inconvenience of its projecting may be avoided. There are several small variations of this contrivance proposed, but the principle is the same in all.

In adapting the invention to a double-barrelled gun, another construction is proposed, shewn in the longitudinal section, fig. 5, and in the cross section, fig. 6; *a*, is the barrel, *b*, the breach, having a conical recess and a small passage through it to the touch-hole, *c*, which is in the cylindrical piece, *d*, projecting from the breach. Upon these cylindrical pieces, *d*, extending from the two barrels, toothed rings, *e*, *e*, are affixed, as shewn in fig. 6, and upon these rings boxes, *f*, *f*, for the reception of the detonating powder. There are also toothed racks, *g*, *g*, which take into the toothed rings, and by passing these racks upwards and downwards, which is done by the button at bottom, the rings are made to turn upon the cylindrical pieces, and with them the powder boxes.

When the rack is pushed up, the box, *f*, will be on the

under side, as at the left-hand barrel in fig. 6. but when the rack is drawn down, as at the right-hand barrel, the box, *f*, will be on the top, and in this situation will deposit a small quantity of the detonating powder through an aperture in the bottom of the box, into the touch-hole. This turning over of the priming boxes may be effected without the racks *g*; a pin passed through the stock behind the breach, as shewn by dots at *x*, *x*, with a rose-head, having endless screws upon it, taking into the toothed rings, would answer the same purpose as the racks, and there are doors on the sides to enable the boxes to be charged with detonating powder.

The blow which discharges the piece is given by the descent of a punch at the end of the main-spring, *p*, which spring is bent up into tension by a rotatory inclined plane or snail, *q*, (see fig. 7.) on the top of the shaft, *r*. At the bottom of this shaft, *r*, there is a bent lever, *s*, which being turned round, causes the lower part of the inclined plane or snail to pass under the main-spring, (at that time in the situation shewn by dots) and as the inclined plane advances in its rotation, it raises the spring into a state of tension, as shewn in the figure. This turning of the bent lever, *s*, brings a small mortice hole in its tail over a spring catch, *t*, which slips into the mortice hole when the spring has been brought to its greatest tension, and the piece is then ready to be discharged. The lock may be fixed in this position, by a small bolt, *u*.

The trigger, *v*, being pressed by the finger, causes a pin on its under side to push down the spring of the catch, *t*, which coming out of the mortice-hole liberates the lever, *s*, at the same time a small inclined plane on the side of the catch, pushes the lever a little further round, and by that means brings the straight side of the snail, *q*, into such a position as enables the main-spring

to slip from it, when its point or punch falling with great force into the touch-hole, discharges the detonating composition, and thereby fires the gun-powder in the barrel.

This last contrivance may be also varied in its detail, the principle of the invention consisting in making the main-spring give the blow which produces the percussion without the employment of minor parts, as in the locks of the ordinary construction.

[*Inrolled, September,* 1824.]

To EDWARD CARTWRIGHT, *of Brewer Street, Golden Square, in the Parish of St. James, Westminster, in the County of Middlesex, Engraver and Printer, for his Invention of, Improvements on, or Additions to, Roller Printing Presses.*

[Sealed, July 27, 1824.]

THESE improvements apply to those kind of roller presses which are employed for copper-plate printing; the first object of the patentee being to obtain a reciprocating action of the pressing rollers, from a rotatory motion communicated by the power of steam, water, or any other first-mover; the second is, a combination of several presses with conical rollers, having an annular table, travelling round, and passing between the several pairs of rollers.

Supposing the first improvement is to be adapted to a copper-plate printing press of the ordinary construction, a large bevelled toothed wheel is to be affixed at each end of the axle of the upper, or pressing roller, which wheels are to take into the teeth of a bevelled wheel that

turns horizontally above the press, and is actuated by a steam engine or other power. One half of the rim of this horizontal bevelled wheel has teeth, and the other half of its rim is plain; now, as the horizontal wheel continues going round in one direction, during half its revolution, the semi-circle of teeth takes into one of the vertical wheels, and drives the pressing rollers round in one direction, and during the other half of its revolution taking into the other vertical wheel, drives the pressing roller back again, that is, causes it to turn in the opposite direction; thus a reciprocating action of the pressing roller is obtained from the continuous motion of the horizontal wheel with the half circle of teeth.

This object may likewise be obtained by placing only one toothed-wheel upon the end of the axle of the pressing roller and attaching a vibrating toothed sector to the side of the press above, which shall take into the teeth of the wheel; to this sector a rod is to be connected, leading from a crank upon a rotatory shaft at a short distance from the press, and as this shaft continues revolving, the crank rod will cause the sector to oscillate, and drive the toothed wheel and the pressing roller backward and forward.

A third variation of this invention is by placing one toothed wheel upon the axle of the pressing roller, and another taking into it upon an horizontal shaft above, which shaft has two bevelled wheels fixed upon it, to be actuated alternately by a continual revolving bevelled wheel, having teeth half round its rim, as in the contrivance first described. By these means the bevelled wheels will be alternately turned in opposite directions, which will, as in the former instances, cause the pressing rollers to revolve backward and forward.

The last proposition is the combination of several

printing presses, set round in a circle, to be actuated by one large rotatory wheel in their centre, and having an annular or ring formed table travelling round between the several pairs of rollers, upon which the copper-plates and paper are to be laid, and to pass through the press as the table proceeds. The rollers of these presses must necessarily be frustums of cones, the apexes of which would meet in the centre of the annular table, the rollers are therefore so mounted in frames upon their axles, that each pair respectively shall meet in a horizontal line, and the upper rollers having toothed wheels upon their axle taking into the large central wheel which is actuated by steam or other power, the whole of the printing presses are put in motion together, and continue driving the annular table round, upon which the workmen place the plates and the paper to be printed.

[*Inrolled, September*, 1824.]

The object of the first part of this patent was effected in a very simple manner by Mr. Perkins, many years ago, in his American Bank Note printing press, for which Mr. J. C. Dyer obtained a patent in the year 1811. The pressing roller had a flat part, which after the plate had passed under the roller, allowed the board to be drawn back to its first situation by a weighted cord passed over a pulley: this mode, indeed, appears preferable to the former, because all the prints taken would be what is technically called *through press work*, whereas in giving the rollers the backward and forward motion above described, there is a liability of producing a doubled or thick impression.—EDITOR.

To DAVID GORDON, *of Basinghall-street, in the City of London, Esq. for his Invention of certain Improvements in the Construction of Portable Gas Lamps.*

[Sealed, 14th April, 1824.]

THESE improvements comprehend, first, an apparatus for regulating the supply of gas to the burners of portable gas lamps, from vessels in which it has been compressed; the object is proposed to be effected by three different modes of introducing a conical pointed screw into the gas passage; secondly, an apparatus with a conical spring valve, opening inwards, by the employment of which gas may be introduced into the vessels without the danger of its escape; and thirdly, apparatus of two kinds, by which gas may be conveniently passed from one vessel to another.

Plate V. fig. 8, is a section of the apparatus; *a, a,* is a piece of metal screwed into a socket, *b, b,* which socket is intended to be fixed into the orifice or mouth of the gas vessel, and a collar of lead or other soft metal is introduced between *a* and *b,* for the purpose of keeping the joint air tight. At *c,* the burner is to be attached, and from the lower part of the socket there is a channel, *d,* by which the gas is enabled to pass into a recess or chamber, *e,* and from thence up the lateral passages, *f, f,* to the burner; *g* is a screw with a conical point, which, when raised, leaves the channel, *d,* open for the free passage of the gas, but when the pressure of the gas within causes it to flow more abundantly than is necessary to supply the burner, the screw, *g,* is to be turned, and its conical point brought down into the mouth of the channel, *d,* so as to contract the channel, and thereby diminish the quantity of gas discharged to the

burner. It is proposed to dip the threads of the screw in bees' wax and oil, for the purpose of making it fit close, and rendering its threads air tight.

A variation of this contrivance is shewn at fig. 9, which is the section of a piece of metal intended to be screwed into the mouth of the gas vessel; *a*, *a*, is the channel for the gas to pass through to the burner, which is to be placed at *b*; *c*, is a screw introduced on the side, its conical end entering the channel, *a*. When the point of this screw is drawn back, the passage of the gas to the burner is unobstructed, but when the point of the screw is advanced, the passage becomes contracted, and the supply to the burner is diminished, or even cut off entirely.

Fig. 10 is another variation of the same contrivance: *a*, *a*, is the channel for the gas to pass from the reservoir to the burner, through the piece of metal shown in section, which, as before, is to be screwed into the mouth of the reservoir; *b*, is the screw with a conical point, entering the channel, and by advancing it, the passage of the gas is partially or entirely stopped.

The apparatus for introducing gas into the reservoirs is shewn in section, at fig. 11. It consists of a piece of metal, *a*, *a*, to be screwed into the reservoir in any convenient part; *b*, is a channel through which the gas is to be injected by a force pump; and *c*, is a conical valve of leather or metal, opening inwards, but kept in its seat by a worm spring. When the gas is forced up the channel, *b*, the valve *c*, is pressed back, and the gas allowed to pass into the concave vessel, *d*, from whence it proceeds through holes into the reservoir; *e*, is a cap with a collar of soft metal, to be screwed into the orifice of the channel, *b*, after the vessel has been filled with gas, for

the purpose of securing the opening, and preventing any accidental escape of gas.

In order to transfer gas from one vessel to another, the apparatus shewn in section, at fig. 12, is to be employed. This consists of a piece of metal, *a, a,* to be attached by its screws to the two vessels in question; *b,* is a cap piece screwed into the former, which cap piece holds a plug, *a,* with a conical end. Previously to introducing this apparatus to the vessel occupied with gas, the plug must be screwed down, so as to close the channel, *d.* When the two vessels are connected to the apparatus, the plug is to be drawn back, which opening the channel, *d,* will permit the gas to rise from the full vessel, and pass through the channel, *e,* into the empty one.

A variation of this apparatus is shown at fig. 13, where the channel, *d,* is to be closed by bringing down the cylindrical plug, *c,* which causes the soft metal ring on its under side to press upon the lower part of the recess, and stop the passage of the gas. When the apparatus has been connected to the two vessels, the cylindrical plug is to be raised, which permits the gas to rise in the channel, *d,* from the full vessels, and to proceed thence through the channel, *e,* into the empty vessel.

[*Inrolled, October,* 1824.]

To JOHN CROSLEY, *of Cottage Lane, City Road, in the County of Middlesex, Gentleman, for his Invention of an Improvement in the Construction of Lamps or Lanterns, for the better Protection of the Light against the Effects of Wind or Motion.*

[Sealed, 5th May, 1824.]

THE subject of this patent applies to street lamps, binnacle lamps, and other lamps placed in exposed situations. It consists in a particular mode of constructing the air passages of a lantern, in order to prevent any sudden gust of wind from extinguishing the light. For this purpose it is contrived that both the ingress to supply the burner with air, and the egress by which the smoke is discharged, shall be through zigzag passages, by which the force of tempestuous winds will be broken, while a perfect draft will be preserved.

Plate VII. fig. 1, is a section of a lantern or street lamp, with the air passages contrived in the manner above stated: *a*, is a tube in which the burner of the lamp, whether of oil or gas, is to be placed; it passes up the middle of a funnel formed aperture, *b*, *b*, and is supported and attached to the bottom of the lantern by small cross arms; *c*, *c*, is a cap or cover slipped upon the tube, *a*, which incloses the funnel. The air, in proceeding to the burner, passes up between the tube, *a*, and the funnel, *b*, and striking against the under side of the cap, *c*, descends, as shown by the dotted arrows, and enters the lantern. Thus the burner is supplied with air, while sudden gusts of wind are prevented from entering the lantern so as to extinguish the light, by the tortuous course in which the air has to pass.

The passages for the exit of the smoke through the

cover of the lantern, are contrived in a similar way ; *d*, *d*, are the cylindrical parts of the cover, which slip into the upper rim of the lantern, *o* ; the top part of *d*, spreads outwards, and is covered with a concave cap, *e*, *e*, the rim of which descends below the edges of *d*, and by that means produces the zigzag passage for the smoke, shown by the dotted arrow, which prevents the wind from blowing into the lantern. A further opening for the escape of the smoke is made at the top of the cover by the cylindrical part, *f*, *f*, turning over in the form of a ledge, from whence several small rods rise, and support the cap, *g*, the edges of which come below the top of the cylindrical part, *f*, and thereby prevent the intrusion of wind from without, but allow the smoke and other vapour arising from the burner to pass off.

It is stated that these contrivances may be varied in several ways, without departing from the principle. For instance, the passages may be made curved instead of zigzag, the object being to prevent any sudden gust of wind from entering the lantern.

[*Inrolled, November,* 1824.]

To JAMES VINEY, *of Shanklin, in the Isle of Wight, Colonel in the Royal Artillery, for his Invention of certain Improvements in, and Additions to, Water Closets.*

[Sealed 6th May, 1824.]

THE object of these improvements is to discharge the soil, water and other matters from the basin of a water closet, by more simple and effectual means than has heretofore been employed. For this purpose, the patentee

proposes to place the basin, and its pipes, in the manner shewn in section at Plate VII. fig, 2.; *a*, *a*, may be supposed to represent a section of the wall of the house against which the water-closet is erected, *b*, is the basin, *c*, the discharge pipe, with a flap opening outwards into a pipe, *d*, placed perpendicularly on the outside of the house. This pipe, *d*, is open to the air above, but leads down to the sewer below; *e*, is a pipe leading from a reservoir of water placed above the water closet, which pipe at its lower part is divided into two branches, *f*. A valve is placed in the pipe, *d*, to regulate the discharge of water, and when the valve is opened, the water flows through the branch pipes, *f*, into the tube, *g*, which extends round the upper edge of the basin. This tube, *g*, has either a long slit or a number of perforations on its under side, through which the water flows, and washes the sides of the basin.

When the closet is not in use, the shutter, *h*, is to be lowered, so as to close the mouth of the discharge pipe; and then the water is allowed to stand in the bottom of the pan up to the dotted line, which will prevent the possibility of any effluvia rising up the pipe, *c*, and the waste water is carried off by a pipe shewn by dots, which is said to lead out into the open air.

After using the closet, the cord, *i*, which is attached to the shutter, *h*, and passes up over pullies, is to be drawn, which raises the shutter, *h*, and allows the contents of the basin to run off, the flap at the end of the pipe opening as it passes, and closing immediately, so as to prevent any vapour from returning up the pipe, *c*, which if it should rise in *d*, would escape into the open air.

[*Inrolled*, *November*, 1824.]

To JONATHAN SCHOFIELD, *of Rastrick, in the Parish of Halifax, in the County of York, Manufacturer, for his Invention of certain Improvements in the Manufacture of Cloth or Fabric, which he denominates British Cachmere.*

[Sealed, 7th April, 1824.]

THE new kind of fabric proposed under this patent is to be made in the following manner. First, let the woollen yarn, which is to be employed as warp in the loom, be spun particularly fine, and let its threads be doubled and twisted together, after which the twist is to be taken out before weaving, in order to make the yarn smooth. The fabric is then to be produced by plane weaving in the ordinary way.

Secondly, after the cloth has been woven it must be cleaned, and then the pile raised by cards, (we presume in a machine something like a gig-mill, but that is not stated;) it is then to be shorn in the same manner as woollen cloths are usually shorn.

Thirdly, the cloth is now to be milled, that is, submitted to the operation of fulling, and then the piece is to be rolled tight upon a wooden roller, and boiled on the roll for several hours; it is then to be dyed of the desired colour, and afterwards dried and finished upon a machine, not stretched out by means of tenter hooks.

The machine proposed, is to consist of three large hollow cylinders of copper or tin, which are to be heated by steam, the cloth is to be drawn off its wooden roller over the surfaces of these heated cylinders, and taken up by another wooden roller, and so on until dry.

Such is the process described, of making this British

cachmere, and its different appearance from other woollen cloths, we presume, will arise from the doubled threads of which the warp is constituted.

[*Inrolled, October,* 1824.]

Original Communications.

To the Editor of the London Journal of Arts.

SIR,

As a society professedly instituted for the encouragement of the arts and sciences, must always be considered to be before the public, and therefore a fair subject for temperate discussion, I feel confident you will not refuse the following observations a place in your valuable journal.

A correspondent in your No. for June last, has expressed an opinion (and I perfectly agree with him,) of the utter uselessness of the society founded in the Adelphi, for the encouragement of arts, &c. &c., conducted as it appears to be. His arguments, as far as they extend, are strong; but, as he does not adduce many examples of the defects of their system, I may, perhaps, be allowed to second his motion with a few additional remarks; and allow me to assure your readers, that I am not actuated by any acrimonious feelings, but merely with a wish to open the eyes of its members, who seem to be dreaming of the benefits they are conferring upon mankind, which, were they awake, would appear to them the mere shadows that all the rest of the world see them. To this end, I will take a cursory review of their

list of premiums for the session 1825—1826; submitting, with deference to the society, a few questions as to the purpose, nature, and utility of the several classes taken separately: and should any of the members of that learned body conceive my conclusions erroneous, I trust to their condescension for due correction. The first class in the list is entitled "Premiums in Agriculture;" for particulars I must refer you to the list aforesaid. I will here beg leave to inquire, to whom these proposals are addressed, and for what end? It is very evident that none but the wealthy can obtain them: for to plant 100 acres of land, (No. 7) a man must, I presume, possess those 100 acres—and so of the others. They are not, then, addressed to the poorer classes, for it would be folly to offer them terms which we know they cannot accept. Now, to effect this object, one would very naturally suppose that some valuable stimulus,—something worth the trouble of seeking, would be held out. The Society offers a medal, that varies in value from five to fifty guineas. The wealthy cannot be supposed to seek this for its pecuniary worth; therefore, if it be *sought* at all, it must be from some more attractive property it possesses—this is called *honour*. Will the society have the kindness to annex to their next book, a table of the value of this honour, (expressed in terms of the coin of the realm,) inherent in each species of medal? that it may be seen what can be an adequate inducement for a man to plant 100 acres of his land with acorns, which may produce oaks for the benefit of his grandchildren. I am no landed proprietor, and therefore cannot, perhaps, duly appreciate the delight of displaying my graces on the opera boards, and the honour of receiving a gold or silver medal from the hand of the Royal President, for having most meritoriously *ordered my labourers* to strew

acorns upon a few spare acres of land, which could be appropriated to no other useful purposes. But I should imagine, from what I have known of the possessors of some of the Society's medals, that if a mean were taken betwixt the measure of honour the Society conceives it confers, and the intrinsic value of the reward bestowed, the landholder or wealthy farmer would find scarcely a thousandth part of his expenditure remunerated. What inducement, then, remains for persons to seek these premiums? Are they sought at all? I am aware that there are sometimes applicants for them; but have any of those applicants planted, sown, or experimented upon their lands, for the *sole purpose of obtaining the Society's medals?*

At the last distribution of rewards, the Society presented to J. Wilson, Esq. of Sneaton Castle, Yorkshire, their gold medal, for planting 174 acres with forest trees. Does the Society suppose that gentleman was induced to make those plantations with the hope of obtaining their medal? I beg to say, from my own personal intimacy with him, and being upon a visit at Sneaton Castle during the time these plantations were going on, that nothing of the sort entered his mind. He had only in view the improvement of his own estate; and, like other gentlemen, planted upon land which was not otherwise capable of being brought into a state of cultivation. He did not seek the Society's medal; but, as Sir John Falstaff says, "it lay in his way, and he found it."

The next chapter of the Society's book is headed "Premiums in Chemistry," and, without doubt, the subjects are for the most part very valuable. But here again the Society seem to have entertained the same lofty opinion of the vastidity of honour allied to their medals. We may form a reasonable guess at this matter from the first

premium in this department of science—" Increasing Steam." This is a subject which most persons, who wished to benefit by their inventive faculties, would esteem well worthy of a patent, in all countries where such protections are to be obtained. The value of the medal offered by the Society appears to be fifty guineas: the honour, then, is equal to the profits of the said valuable patent, less the said fifty guineas. Now were I so fortunate as to be possessed of this discovery, I should esteem 10,000 guineas but a sorry equivalent—therefore, to me the HONOUR would be at the very least worth 9,950 guineas. Enough of Chemistry.

Let us now proceed to the section " Polite Arts." I have been more than usually perplexed in my endeavours to find the value of the honour in this branch, as, in every case, the medal, or bounty, appears far to exceed the value of the subject. This is strange, but, nevertheless, true—for here we find little and great girls and boys obtaining more for their, or rather their masters', daubs and scratches, than many eminent artists.

The next three sections, " Mechanics, Manufactures, and Colonies, &c." I will dispatch with but a very few words, for this repetition of the same question—Cui bono? is rather tedious to me, and I should suppose to you also, Mr. Editor. Your correspondent aforenamed has sufficiently exposed the folly of the premiums on mechanics. Of manufactures I have only to repeat what has been already said upon agriculture. Nobody can be expected to cultivate fine wool, (No. 228.) expressly to gain the society's trivial reward—and if that reward is not to act as the primum mobile; if it is not to give the *impulse*, where is its utility? I cannot, for the life of me, comprehend the benefit that the country is to derive from the Society's taking upon itself to reward (so they call it)

men who have effected different things *entirely with a view to their own interests.* Would, I should be glad to know, Messrs. Cowley and Staines, who have received the society's rewards for the cultivation of British opium for several years in succession, have taken the trouble to train the poppy, and to gather the drug, if its produce in the market had not been found to realize a tolerable profit? Again, three years (I believe in succession) the Society bestowed fifty guineas upon a person named Denovon, for the curing of British Herrings after the manner of the Dutch. What benefit, I would ask, has arisen to the public from this?—is there now a single herring cured upon Denovon's plan to be purchased in the metropolis, or in any other part of the kingdom?

Thus a merchant imports the produce of other climes, thinking to obtain a good price for it in the markets of this country, without previously giving a thought to the Society's medals; and the farmer plants, sows, manures, and banks out lands from the inroads of the sea, all for the direct interest he has therein, and not for the Society's medals.—How then I will ask does it chance that there are claimants for these medals? Either those claimants have the honour to be Members of the Society of Arts, and thence have a direct interest in upholding the follies of the Society, or, finding that such rewards exist after they have performed the conditions, they think they may as well receive them as not.

I cannot close these remarks without alluding to the patronage which the Society have lately bestowed upon grass bonnets, in imitation of Leghorn straw; there does appear to have been some little stimulus raised by the multitude of small rewards, which have been distributed among the children of charity schools, and others in humble life, in several parts of the kingdom, for the pro-

duction of these really elegant articles: there remained, however, another more effectual means of promoting this manufacture, if such was the Society's object, and which one should think, if they had really any view beyond the ostentatious display of their patronage, would have been embraced by them;—need I mention the influence which nearly two thousand members, all moving in respectable walks of life, and among these many of the affluent and great, might have effused among the females of their own families and circles—such an extensive adoption of what they profess to be a valuable and important article of British manufacture, would indeed have been PATRONAGE.

I would then strenuously, and as a friend, advise that if the farce must be kept up, the Society send their messengers to all who may chance to have taken greater pains in rearing a finer breed of sheep *for the market*, and give these medals upon the spot, without troubling the owner to ask for it, and to display himself at the Opera. They had better too, enquire amongst the merchants, who is the greatest importer of goats (267), Annatto (274) and this and that (&c. &c.) and send their rewards accordingly. A wise measure like this would save a great deal of trouble to all parties, would be of quite as much service as the present usage, and gain the Society much greater applause and estimation.

Might I be permitted to throw out a hint as to the Society's repository. An extensive collection of models of machinery and implements employed in the different branches of Arts and Manufactures, such as is shewn to the public in Paris, would really be a valuable depôt, but what can be the utility of such an heterogenous collection of out of the way things as are displayed at the Adelphi? There is not, as connected with the staple

manufactures of the kingdom, a single model of a machine of any kind for the preparation, carding, or spinning of wool, cotton, or flax.

I shall now conclude by modestly requesting the following favours of the Society:—1st. An algebraical formula, whereby to determine the exact proportion of honour and gold in a standard medal.—2nd. A logical definition of the utility of the Society.—3. How often through partiality, a good thing is allowed to be rejected, and a bad one rewarded?—4th. How long when party runs high, or the committee's brains (such *par courtesie*) are dull, their deliberations are allowed to extend undecided? These demands satisfied, I shall be better able to form a correct judgment of what at present appears the most childish, useless, and wasteful affair that ever was concocted. I should advise them much, to contribute their funds to the benevolent plans of your correspondent, whose steps I have followed. With many excuses for having troubled you with so long a letter upon so worthless a subject,

I remain, Sir,

Your most obedient Servant,

Q——?

Novel Inventions.

ROBERTS' *Apparatus for Working in Dense Smoke or other Deleterious Vapour.*

IN our ninth volume, page 258, we mentioned an experiment performed in the early part of this year at the

Mechanics' Institution, in Southampton-buildings, Chancery-lane, London, by a man named Roberts, who with the assistance of an apparatus of his own invention, is enabled to work in dense smoke in houses or ships on fire, or in mines that are filled with deleterious vapours. We have procured one of these apparatus, which is extremely portable, and by no means inconvenient to wear even for hours together, and the following is a description of its construction and use.

The apparatus consists of a cap or hood made of leather, or of any other air-tight material, which, after being passed over the head of the wearer, is to be bound close round his neck, in order to exclude the surrounding air. To the front of this cap or hood a flexible pipe is attached, for the purpose of conducting air into the cap, to supply the mouth and nostrils, and support respiration. At the lower part of the pipe, a sponge is introduced, through the pores of which the air must proceed in its passage to the interior of the cap. This sponge is to be saturated with water previously to entering a house on fire when the smoke and deteriorated air as it passes through the wet sponge, becomes decomposed and purified.

Plate VII. represents the hood and its appendages in three different views. Fig. 3. is a front view of the hood and the flexible tube; fig. 4. is a side view of the same, and fig. 5. is a section cut through the hood and pipe in profile, shewing the interior, the same letters referring to similar parts in the three figures. The outer part of the hood is made of leather, or of any air-tight material, waxed calf leather is to be preferred: this is usually lined or coated on the inside with wash leather (chamois skin), or other soft material, which is padded with cotton wool, for the purpose of enabling the hood to lay close to the cheeks and forehead of the wearer, to prevent any

accidental intrusion of the deteriorated atmosphere from reaching the mouth or nostrils.

a, *a*, are glazed openings or eye-pieces, for the wearer to look through as he proceeds in his work; one eye-piece in the middle would answer the purpose, but is not so convenient. The padding round these should lie close to the face, in order to prevent the breath from condensing upon the glass: *b*, is a proboscis or nose piece, projecting from the front of the hood, and to which the flexible leather pipe, *c*, is attached by an union screw, *d*. At the bottom of the pipe a cone or funnel, *e*, is attached, and a piece of sponge, *f*, introduced, which closes the aperture, and is prevented from falling out of the funnel by a rim round the lower part. The flexible pipe is formed by a wire-worm spring covered with leather, and has two straps upon it for the purpose of buttoning to the jacket of the wearer, in order to keep the pipe back out of the way when he is at work; *g*, is a mouth piece in the proboscis, closed air-tight by a cork stopper, this may be opened when the wearer gets into a pure atmosphere, as at a door or window, for the purpose of breathing freely, or calling out for assistance; *h*, is an aperture opposite to the ear, which is also closed by a cork stopper, this may be opened in a pure atmosphere for the wearer to hear any communication, but this aperture is not in general found necessary, and therefore may be dispensed with; *i*, is a strap for drawing the hood close round the throat, which is of the utmost importance to be attended to, in order that the surrounding atmosphere may be perfectly excluded from the interior of the hood; *k*, is also a strap passing round the back of the head, for the purpose of keeping the padded part of the hood close upon the face.

The purposes to which this apparatus may be applied

are several, besides that of entering the dense smoke of houses and ships on fire,—as, for instance, it may be worn, and effectually protect the wearer in mines or other situations where the atmosphere is not capable of supporting life,—it may also be used with undoubted success in manufactories, where an unwholesome effluvia is emitted, and where the air is impregnated with infinitely small particles of poisonous matter, such as in smelting and calcining of certain metals, grinding drugs, ores, or chemical compounds—in water gilding and other businesses where poisonous matters are apt to settle upon the lungs—in dry grinding, such as pointing needles, and a great variety of other situations which are found to be extremely detrimental to the workmen.

It is, however, to be observed, that though sponge moistened with water will, under most circumstances, effectually filter the injurious matters contained in a deteriorated atmosphere, such as the sulphur and smoke, or small particles of dry substances, as powdered minerals and fine dust of steel; yet for entering mines, where the atmosphere is impregnated with carbonic acid gas, the sponge should be wetted with an alkaline liquid, in order to neutralize the acid. Soap and water is generally found to answer the purpose; and so in all cases where the atmosphere is affected with any injurious chemical matters in a state of vapour, the liquid employed in the sponge should be of that kind which will neutralize the deleterious properties of the atmosphere.

Roberts appears to have been first led to this invention by discovering that a woollen cloth moistened, and held over the mouth, would prevent the effects of what the miners call choke damp. He states that he has, when other men have fallen around him in a mine, from the effects of the carbonic acid gas, taken off his flannel

shirt, and placing that part over his face which had been moistened by perspiration, escaped out of the mine in safety. The same effect has resulted from drawing a woollen cap over the face, which had been previously moistened with water. It is, therefore, important to remember, that a wet cloth or sponge held over the face, would answer the purpose, upon an emergency, for a short time, in rescuing persons from suffocation by smoke, or probably from being consumed in the flames.

It must not, however, be supposed that this contrivance will produce oxygen for respiration in atmosphere where *no oxygen exists*. That is not the case, at least to a very small extent. The wetted sponge acts as a filter, separating and taking up the deleterious matters, and allowing the pure air to pass to the lungs; or where a chemical solution is employed, decomposing the injurious parts of the air, and rendering it fit for animal respiration. In low damp situations, under ground, it sometimes happens that the heavy gases are stagnant without any oxygen being mixed with them. In such cases, which, indeed, are very rare, the apparatus in question could be of little or no use; but in all situations where a small portion of oxygen is present, the injurious gases may be decomposed, and the oxygen abstracted for respiration.

This apparatus, complete, costs about three pounds; and as it may be worn by any person without inconvenience, it is really worth the consideration of the public. How far it might be advisable to place these hoods at convenient stations, as there is no doubt many destructive conflagrations might have been prevented, when first discovered, if dense smoke had not prevented any person from entering, to apply water upon the very spot where the fire had originated.

Self-acting Feeder for High-Pressure Steam-Boilers.

Mr. R. W. Franklin, of Tottenham Court Road, London, has invented an apparatus for the above purpose, which he has presented to the Society of Arts, and received in return their silver medal and fifteen guineas. The following is his account of this contrivance:—

It is the universal practice to feed the boilers of condensing engines by means of a float; but to its application in the usual way to high-pressure boilers, there are two objections. The first is the inconvenient height of the jack-head, in order to counterbalance the pressure of the steam, (a pressure of forty pounds on the inch requiring the jack-head to be seventy feet higher than the boiler): the second is the difficulty of packing the float-rod, so as to prevent the escape of steam, and yet allow the rod to move easily when acted on by so small a force as the hydrostatic weight of the float.

My improvement consists in the substitution of a heavily-loaded valve instead of a high jack-head, and in avoiding altogether the use of a stuffing box, by placing the lever of the float within the boiler, as will be evident on referring to the representation in plate VII. fig. 6.

a, *a*, Is the top of the boiler, *b*, the man-hole, *c*, the level of the water in the boiler, *d*, a lever suspended by an arm to the top of the boiler, and having the float, *e*, at one end and the counterpoise, *f*, at the other. *g*, is a rod of half-inch round iron, connected with that arm of the lever which carries the counterpoise: it passes through a guide or ring, which is rivetted near the bottom of the feed-pipe, *k*, and expands at bottom into a round flat disk, *h*.

The feed-pipe, *k*, is long enough to have its lower orifice always below the level of the water, *c*; its upper end is

closed by the valve, *l*, and to the bottom of the valve is screwed a long tail or spindle, which, when the valve is shut, descends below the opening of the feed-pipe, and almost rests upon the plate or disk, *h*. As the water lowers by evaporation, the float end of the lever descends and the opposite end rises; the consequence of this will be to raise the rod, *g*, to bring the plate, *h*, in contact with the end of the spindle of the valve, *l*, and thus to raise the valve itself above the opening of the feed-pipe, as represented in the plate. The box, *m*, having been previously filled with water by means of the forcing-pump at the end of the service-pipe, *n*, *n*, (not represented in the plate,) all reflux of hot water from the boiler is prevented by the valve, *o*. As soon as the pressure of the forcing-pump exceeds that of the steam, the valve, *o*, is lifted and water passes through the pipe, *n*, into the box, *m*, and thence down the feed-pipe, *k*, into the boiler, the valve, *l*, being prevented from closing by the support which it receives from the plate, *h*. As the level of the water in the boiler rises, the counterpoise end of the lever, *d*, descends, and with it the rod, *g*, the plate, *h*, and the valve, *l*. In this position of the machinery the water delivered by the service-pipe raises the valve, *p*, passes into the box, *q*, and flows off by the waste water-pipe, *s*. The valve, *p*, also acts as a safety-valve to the boiler, its pressure being adjusted by means of the weight on the lever, *r*.

The working pressure of the steam in the boiler having been determined, the load on the valve, *p*, must be greater than this, but less than the power applied to the forcing-pump.

White Copper.

M. Frick, a German chemist, has formed several alloys in imitation of white copper, or the Pakfong of the Chinese. A mixture in the following proportions:

Copper . . .	47,15
Nickel . . .	32,25
Zinc	26,00

composed a greyish alloy, very little malleable when cold, not at all when heated, and flattening with difficulty. Another alloy according to this formula:

Copper . . .	50,00
Zinc	31,25
Nickel . . .	18,75

produced a white metal susceptible of a beautiful polish, easily flattened, malleable when cold, unalterable by the atmosphere, and sonorous like silver. A third alloy is formed as follows:—

Copper . . .	53,39
Zinc	29,13
Nickel . . .	17,48

approached still nearer to silver in colour and sound; it was harder than that metal, very tenacious, but also exceedingly ductile. Its specific gravity at 15° 4′ of Reaumur was 8,556.

Magnetic Pole.

Whether the earth possesses two or four magnetic poles is a disputed point which Professor Hausteen proposes to

clear up, by making a journey into Siberia, to search for and ascertain the exact site of the magnetic pole—there alleged to be situated, or at any rate by a careful and extensive series of experiments on the variation and dip of the needle, and the magnetic intensity in that inhospitable region, to furnish useful data for magnetic investigations; also by pendulum observations to supply some much wanted data as to the figure of the earth, and the position of places thereon, the climate and natural productions, &c. are not to be overlooked. The King of Sweden patronizes this journey, which is intended to be of two or three years' duration.

Barometers.

Mr. Daniell has found that air insinuates itself into the vacuum of the best made barometers, by creeping up between the mercury and the glass, and that it will insinuate itself between any fluid and any solid where there is not attraction enough for the former to cause it to adhere in a state of moisture. If any gas be confined in a glass jar for any length of time over mercury, it will make its escape, and its place be occupied by atmospheric air; whereas, the same gas, if confined in water, will be preserved unmixed. Hence, the best made barometers are often studed with air bubbles. To cure this, Mr. Daniell welds a narrow ring of platinum to the open end of the tube, which is immersed in the cistern; boiling mercury amalgamates itself with platinum, and adheres to it when cold, by which means the passage of the air is prevented as effectually as if the tube and the fluid were one mass of matter.

A New Contrivance for Ventilating and Airing of Vessels, by Doctor Wuettig.

The dangerous diseases, which very often afflict the crews of vessels, particularly on long voyages, is generally attributed to the imperfect circulation of the air in the hold, and also in the smaller parts of the vessel.

Several plans have been proposed for this purpose, but the most successful is stated to be the ventilator invented by Doctor Wuettig. It consists of an iron furnace, into which is placed a hollow copper globe, with two aspirating pipes, and an evacuation tube. As soon as the fire is lit in the furnace, the evacuation tube begins to draw, and the draught increases as the globe becomes heated, so that when it is red hot the draught is very great.

If the fire in this furnace is burning for an hour or two about once or twice a day, it will exhaust the atmosphere of the hold to the extent of about 3 or 400 cubic toises, and the pure air will of course flow in to supply its place.

[This is the same contrivance as that proposed by Mr. Tyer, and communicated to this Journal in 1820, see Vol. I. page 61.]—Editor.

Polytechnic and Scientific Intelligence.

Society Islands.

Improvements are rapidly going on in the arts of civilized life. At Otaheite a sugar manufactory has been established, where sugar is made from the native cane.

At Eimeo, a building designed for a cotton manufactory has been erected; the machinery for spinning and weaving having been imported from England, and is to be put in motion by water power. Cotton grows spontaneously, and in very great abundance.

Pectic, or Coagulating Acid.

This new acid has been discovered by M. H. Braconnot, and receives its name from πηκτις, coagulum, in consequence of its resembling a jelly or gum. It is found in all vegetables. It is sensibly acid. It reddens turnsole papers. It is scarcely soluble in cold water, but more so in hot water, and is coagulated into a transparent and colourless jelly by alcohol, by all the metallic solutions, by lime-water, water of barytes, the acids, muriate and sulphate of soda, and nitre. It forms with potash a very soluble salt, which has the remarkable property of communicating to large masses of sugar and water the effect of gelatinising, which renders it of great use to the confectioner. M. Braconnot in this way prepared aromatised jellies perfectly transparent and colourless, and very agreeable to the taste and eye. He also made with rose water, coloured with a little cochineal, rose jelly of exquisite taste.—*Annales de Chimie.*

American Steam Boat.

The Trenton is constructed upon an entirely new mode. Her boilers rest upon the guards projecting over the water,

from each side of the boat. This leaves the deck entirely unobstructed, and forms what may be called a promenade deck. The space usually occupied by the boilers is converted into convenient and handsome dressing rooms. Should any accident happen to the boilers, the water would be thrown directly into the river, and not in the least endanger the passengers. And what is more important, the annoying degree of heat in the dining cabins is not felt. She was built at Hohoken, and it may be fearlessly asserted, the improvements in the arrangement and disposition of her machinery, are far greater than any that have been yet made since the first introduction of these boats into our waters. She might not unaptly be called the *Water Travelling Balloon.*—*Philadelphia Freeman's Journal.*

Rapid Distillation.

Professor Oersted has pointed out a method of considerable utility in the evaporation of liquids. He fastens together a great number of fine metallic rods or wires, and puts them in the bottom of the still or evaporating vessel, and by this means he distils seven measures of brandy with the same fuel, which without the rods would distill only four.

Tanning Leather in Cold Weather.

Have an iron kettle or boiler for the purpose of containing water, with a wooden lid or cover; a wooden penstock let into the boiler through the lid or cover, and extending upwards; in one side of the penstock, towards the upper end, is a hole made by an augur, into which

enters a common conductor of wood or other materials. The other end of which conductor, passes over the tan vats —the steam arising from the boiler, which is fixed in an arch, ascends the penstock, and from thence passes into the conductor over the vats;—one or more wooden conductors to each vat, to be let into the main conductor, and penetrate downward into the vat, which is open at the lower end, which will enable persons to tan leather in cold climates in the winter season as well as in summer.

Extracts from Bark.

That which is designed for the use of tanners is found to be most highly improved, by adding to every hundred weight of the ground bark, eight pounds of red berry, which grows upon sumack; the advantages therefrom are hardly conceivable, as in the first place it opens the nature of the bark, and causes a much quicker precipitation of the light woody matter, when settling for evaporation. It also holds in a complete dissolved state every particle of resinous matter, contained therein, and supplies the great loss of vegetable acid, so necessary in tanning, and which evidently escapes during the evaporation. The good effects of this addition in regard to tanning, is quickly to be observed from its immediate action on the leather, to which it imparts a fine colour, and fills in the completest manner.

Method of Making Transparent Soap.

Tallow is the basis of all soaps for the toilette known under the name of Windsor soap, and tallow soap dissolved by heated alcohol becomes transparent, and returns to its

solid state on cooling. It is this fact which has led to the discovery of transparent soap. When well prepared, this soap should have the appearance of white sugar-candy. It may also be coloured, and vegetable colours are for this purpose preferable to minerals. Any person can make this soap, by putting into a thin glass phial half a cake of Windsor soap, cut small, filling the phial half-full of alcohol, and placing it near the fire till the soap is dissolved. This mixture, put to cool in a mould, gives the transparent soap.

Electrical Eel.

A specimen of the *gymnotus electricus* has lately been examined by Parisian *savans*. The greater number were satisfied with a single shock; but one doctor, either urged by a greater zeal for science, or governed by a more insatiable curiosity, resolved to try the utmost extent of the animal's powers, and seized it with both his hands; but had quickly reason to repent of his temerity, for he immediately felt a rapidly repeated series of the most violent shocks, which forced him to leap about in the most extraordinary manner, and to utter the most piercing screams from the agony which he felt. He then fell into convulsions, in consequence of which his muscles became violently contracted, as, from the strange property of the fish, it became impossible to detach the animal from his grasp.

Manufacturing Sugar and Molasses.

After collecting the juice or sap, in the usual way, instead of boiling it down to sugar and molasses in a kettle alone, attach a wooden tube to the top of the kettle, either

on the in or outside, which must be well fitted on. So much juice or sap must then be put in, as to rise above the kettle; and its surface must not, at any time, whilst boiling, be suffered to fall below the bottom of the wooden tube. By this means the juice or sap will boil away or evaporate faster; and its surface being at all times, while boiling, in contact with the wooden tube, it will be prevented from burning on and adhering to the side of the kettle; and the sugar and molasses thus manufactured, will be much more pure than if manufactured in the usual way.

New Patents Sealed, 1825.

To Charles Friena, of Bell Lane, Spital Fields, in the county of Middlesex, sugar refiner, for his discovery of an improvement or improvements in the process of refining sugar.—Sealed 26th July—6 months.

To John Reedhead, of Heworth, in the county of Durham, gentleman, for his invention of certain improvements in machinery, for propelling vessels of all descriptions both in marine and inland navigation, which he conceives will be of public utility.—Sealed 26th July—2 months.

To John Edward Brooke, of the township of Headingly, in the parish of Leeds, in the county of York, woollen manufacturer, and James Hardgrave, of Kirkstall, in the said township, woollen manufacturer, for their invention of certain improvements in, or additions to, machinery used in scrubbing and carding wool or other fibrous substances. —Sealed 26th July—6 months.

To David Oliver Richardson, kerseymere and cloth printer, and William Hirst, manufacturer, both of Leeds,

in the county of York, for their invention of certain improvements in the process of printing or dying woollen and other fabrics.—Sealed 26th July—6 months.

To James Kay, of Preston, in the county of Lancaster, cotton spinner, for his invention of new and improved machinery, for preparing and spinning flax, hemp, and other fibrous substances, by power.—Sealed 26th July—6 months.

To Richard Witty, of Sculcoats, in the county of York, civil engineer, for his invention of an improved chimney for argand and other burners.—Sealed 30th July—6 months.

To Joel Lean, of Fishpond House, near Bristol, being one of the people called Quakers, for his new invented machine for effecting an alternating motion between bodies revolving about a common centre or axis of motion. Also certain additional machinery or apparatus, for applying the same to mechanical purposes.—Sealed 30th July—6 months.

To the Rev. William Barclay, of Auldeare, in the county of Nairn, for his invention of an improved instrument, to determine angles of altitude or elevation, without the necessity of a view of the horizon being obtained.—Sealed 30th July—6 months.

To Richard Badnall, the younger, of Leek, in the county of Stafford, silk manufacturer, for his invention of certain improvements in the manufacture of silk.—Sealed 30th July—6 months.

To Samuel Bagshaw, of Newcastle-under-Line, in the county of Stafford, gentleman, for his invention of a new method of manufacturing pipes for the conveyance of water and other fluids.—Sealed 8th August—2 months.

To George Charleton, of Maidenhead Court, in the parish of St. John, Wapping, and William Walker, of

New Grove, Mile End Road, in the parish of St. Dunstan, Stepney, both in the county of Middlesex, master mariners, for their invention of certain improvements in the building or constructing of ships or other vessels.—Sealed 10th August—6 months.

To Samuel Lord, James Robinson, and John Forster, all of Leeds, in the county of York, co-partners, merchants, and manufacturers, for their invention of certain improvements in machinery, for and in the process of raising the pile on woollen cloths and other fabrics; and also in pressing the same.—Sealed 11th August—2 months.

To William Hirst, Henry Hirst, and William Heycock, woollen cloth manufacturers, and Samuel Wilkinson, mechanic, all of Leeds, in the county of York, for their invention of certain apparatus for preventing coaches, carriages, mails, and other vehicles, from overturning.—Sealed 11th August—6 months.

To John Stephen Langton, of Langton Juxta Partney, in the county of Lincoln, Esq. for his invention of an improved method of seasoning timber, and other woods.—Sealed 11th August—6 months.

To Jacob Perkins, of Fleet-street, in the city of London, engineer, in consequence of a communication made to him by a certain foreigner, residing abroad, for certain improvements in the construction of bedsteads, sofas, and other similar articles.—Sealed 11th August—6 months.

To Henry Richardson Fanshaw, of Addle-street, in the city of London, silk embosser, for his invention of improved apparatus for spinning, doubling, and twisting or throwing silk.—Sealed 12th August—6 months.

To James Butler, of Commercial Road, in the parish of Lambeth, in the county of Surrey, for his new invented method of making coffins, for the effectual prevention of

bodies being removed therefrom after interment.—Sealed 12th August—2 months.

To Marc Lariviere, now residing in Frith-street, Soho, in the county of Middlesex, machinist, late of Geneva, in Switzerland, for his machine for perforating metal plates of gold, silver, tin, platina, brass or copper, being applicable to all the purposes of sieves, hitherto employing either canvas, linen or wire.—Sealed 15th August—2 months.

To Joseph Alexander Taylor, of Great St. Helen's, in the city of London, gentleman, for his invention of a new polishing apparatus, for household purposes.—Sealed 13th August—6 months.

To Charles Downing, of Bideford, in the county of Devon, gentleman, for his invention of certain improvements in fowling pieces, or other fire-arms—Sealed 15th August—2 months.

To Alexander Shoolbred, of Jermyn-street, in the parish of St. James, in the county of Middlesex, tailor, for his invention of certain improvements on, or a substitute for, back stays and braces, for ladies and gentlemen, chiefly to prevent relaxation of the muscles.—Sealed 18th August—6 months.

To Phillip Taylor, of the City Road, in the county of Middlesex, engineer, for his invention of certain improvements in making iron.—Sealed 18th August—6 months.

To Peter Williams, of Leeds, and James Ogle, of Holbeck, both in the county of York, cloth manufacturers, for their invention of certain improvements in fulling mills, or machinery for fulling and washing woollen cloths, and such other fabrics as may require the process of felting or fulling.—Sealed 20th August—6 months.

D.	H.	M.	S.	
2	0	0	0	☿ Stationary.
3	5	0	0	☾ in conj. with δ in Aries.
4	5	0	0	☾ in conj. with A in Taurus.
4	15	0	0	☾ in conj. with 2 η in Tau.
5	4	8	0	☾ in □ last quarter.
5	21	0	0	☾ in conj. with ♄ long. 21° in Gemini ☾ lat. 24′ S. ♄ lat. 1° 30′ S. diff. lat. 1° 6′.
6	15	0	0	☾ in conj. with η in Gem.
6	18	0	0	☾ in conj. with μ in Gemini.
7	12	0	0	☾ in conj with ζ in Gem.
9	13	0	0	☾ in conj. with 2α in Cancer.
10	6	0	0	♀ in conj. with δ in Cancer.
10	7	0	0	☾ in conj. with ο in Leo.
10	15	0	0	☾ in conj. with π in Leo.
12	3	0	0	Ecliptic Conjunction or ● New Moon.
12	15	0	0	☽ in conj. with ☿ long 26° in Virgo ☽ lat. 4° 55′ S. ☿ lat. 3° 50′. S. diff. lat. 1° 5′.
14	7	0	0	☽ in conj. with i in Virgo.
16	21	0	0	☽ in conj with δ in Scorpio.
16	21	0	0	☿ in conj. with ν in Leo.
18	18	29	0	☽ in □ first quarter.
19	3	0	0	☽ in conj. with 1. μ in Sag.
20	0	0	0	☿ in conj. with τ in Taurus.
20	3	0	0	☽ in conj. with π in Sagit.
20	7	0	0	☽ in conj. with d in Sag.
20	8	0	0	☽ in conj. with ♅ long. 16° in Cap. ☽ lat. 2° 35′ N. ♅ lat. 28′ S. diff. lat. 3° 3′.
21	13	0	0	☽ in conj. with β in Cap.
22	20	42	0	☉ enters Libra.
25	0	0	0	☿ Stationary.
25	0	0	0	♅ Stationary.
26	16	1	11	♃'s 3rd Sat. will emerge.
26	16	13	0	Ecliptic Opposition, or ○ full moon.
28	1	0	0	♂ in conj. with α in Leo.
28	6	0	0	An Occultation of ♀ and α in Leo, but invisible in London.
28	10	0	0	♀ in conj with ♂ long. 26° in Leo ♀ lat. 28′ N. ♂ lat. 1° 17′ N. diff. lat. 49′
28	19	0	0	☿ in conj. with τ in Leo.
29	8	0	0	♃ in conj. with ρ in Leo.
30	11	0	0	☾ in conj. with δ in Aries.

The waxing moon ☽ — the waning moon ☾

Rotherhithe. J. LEWTHWAITE.

METEOROLOGICAL JOURNAL, JULY AND AUGUST, 1825.

1825.	Thermo.		Barometer.		Rain in inches.	1825.	Thermo.		Barometer.		Rain in inches.
	Higt.	Low.	+	—			Higt.	Low.	+	—	
JULY						AUG.					
26	70	48,5	30,24	30,22		10	60	48	29,68	29,64	
27	72	43	30,22	30,20		11	67	46	29,90	29,86	,725
28	78	45,5	30,15	30,14		12	70	48	29,96	29,94	
29	75	48,5	30,16	30,11		13	64	52	29,63	29,45	
30	77	42	30,10	30,05		14	65	56	29,44	29,40	
31	81	43	30,00	29,97		15	65	55	29,56	29,44	
AUG.						16	70	55	29,80	29,70	
1	87	53	30,00	29,96		17	74	48	29,80	Station	
2	79	56	29,96	Station		18	65	54	30,06	29,90	
3	73	44	29,95	29,85	,15	19	65	53	30,10	Station	
4	71	54	29,59	29,45		20	70	40	30,26	30,20	
5	72	54,5	29,53	29,45	,575	21	79	50	30,26	Station	
6	71	51	29,61	29,60		22	69	50	30,20	30,17	
7	70	49	29,77	29,70	1,25	23	74	51	30,17	30,07	
8	68	47	29,68	29,52		24	72	47	30,06	Station	
9	69	52	29,66	Station	,05	25	74	46	30,08	30,07	

CHARLES H. ADAMS, LOWER EDMONTON.

LITERARY AND SCIENTIFIC NOTICES.

The Memoirs and Correspondence of Paul Jones, from the original documents, in possession of John Henry Sherburne, Register of the Navy of the United States, is in the press, and will be ready for publication in a few days.

Geography.—Two British vessels have been for some time employed in surveying the Persian Gulph, laying down the surrounding coast, and settling the latitude of places, &c. This must prove a desideratum, as it is one of the parts which has long been thought to need the attention and skill of the Geographer.

The Russian frigate Kruizer, Captain Lazaroff, which sailed from Portsmouth in November, 1822, on a voyage of discovery, touched at that port about a week ago. She has visited Van Diemen's Land, Otaheite, and went high up the North Pacific Ocean.

"The Elements of Physiology," by Professor Rudolphi, of Berlin, comprising General Physiology, is about to be translated from the German, by William Dunbar How, M.D. Part I. will be ready in a short time. The work is to be completed in 1 vol. 8vo.

Among new works of fine art in progress, we hear that Mr. Allan is engaged on an historical subject in the reign of Elizabeth, for Dr. Meyrick, one of whose ancestors figured on the occasion.

Russian Discoveries.—The enterprising Lieut. Kotzebue arrived at the port of St. Paul, Kamschatka, early in June, 1824, having visited and corrected the positions of several Islands, &c. in the South Pacific Ocean. Among others, he observed the Island of Karishoff, (Lat. 15° 27′ S. and Long. 145° 24′ 22″ W.) which was seen by Ragewin in 1722. He also discovered several new Islands, and named one Predpriætige, after the name of his vessel; it is in Lat. 15° 58′ 18″, and Long. 140° 2′ 38″. The account of this voyage, with charts, &c. has been forwarded to Petersburgh, and will probably be published in a short time.

Mr. Thomas Sharp has announced a Dissertation (with details) on the Coventry Pageants and Mysteries, to which will be added, the Shearmen and Tailors' Pageant, &c. A History of the earliest Dramatic Entertainments of this country has long been wanted, and this cannot fail to be a curious, and we trust it will be a valuable, publication.

The Germans speak of having discovered a mode of preventing the scarlet fever, by means of inoculation, as certain, say they, as vaccination for the small-pox. As this disorder can only happen once to the same person, it is not improbable such treatment may be efficacious. Ten or twelve grains of extract of belladona is to be mixed with a pint of water, and four spoonfuls of this mixture is to be administered to the children for ten successive days; this produces red spots on the skin, like those of the scarlet fever, a contraction and burning in the throat, and a slight fever, in which are also symptoms of that disorder. Children who have contracted this factitious fever are, it is said, protected from the real one, and may, with impunity, sleep in the same bed with persons ill of the malady. Drs. Sœmmering, Hufeland, Meglin, &c. are partizans of the new system; and Dr. Lemereir, of Paris, has also adopted it.

A Society for the promotion of Science and Literature, has just been established, under the head of the *Northern Institution*, at Inverness, which, judging from the learning and zeal of many of the members, promises well for the cause of useful and ornamental knowledge in the North.

LONDON:
SHACKELL AND ARROWSMITH, JOHNSON'S-COURT, FLEET-STREET.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. LIX.

Recent Patents.

To William Church, *of Birmingham, in the County of Warwick, Esq., for his Invention of certain Improvements in Machinery for Printing.*

[Sealed 19th February, 1824.]

In our sixth volume we have given plates and descriptions of the very ingenious apparatus invented by Dr. Church, for casting types, composing them into words and sentences, and afterwards printing the sheets of paper therefrom. The peculiarity of this invention has called forth considerable animadversion, and the public press has treated it with no small portion both of ridicule and applause, in many instances equally resulting from an utter ignorance of the merits of the subject. A long procrastination in bringing this invention into

public use, has now caused it to sleep, (as many think, an "eternal sleep"), like some other subjects which perhaps we may shortly revive, and send forward again to the light of day. It cannot, however, be a matter of surprise, that in surmounting the practical difficulties which must present themselves, in the completion of machinery that contemplates an extensive range of objects, considerable time should have elapsed; many instances occur in the annals of mechanical art, in which inventions founded upon the most indisputable principles of science, have never been realized during the lives of their projectors. The steam engine of Watt was not brought to perfection until the whole term of his patent-right had expired! It is, therefore, incumbent upon the public to bear patiently such delays as result from the unforeseen difficulties to which almost every inventor is exposed, in bringing his views to perfection, and to wait the period, however protracted, when the bright hopes of the aspiring genius shall at length blaze out into maturity.

We have involuntarily been led to these general remarks, by the recollection of the contemptible ridicule on the one hand, and the fulsome commendations on the other, to which Dr. Church's inventive talents have been exposed in the public prints, and without intending to apply those remarks personally, have adopted them as a preface to the following subject.

The present patent is for improvements upon that part of the invention above alluded to, which comprises the printing press. The publication of this subject has been delayed under the expectation of being enabled to speak practically of its usefulness. We have now to state that we have seen a printing press in operation upon this improved principle, which gives impressions equal to the

best works of the most approved printing presses, and with a rapidity that is really surprising. We carefully watched its operation for some time when working under the disadvantage of inexperienced hands, and are in possession of a few sheets which were then printed at the rate of eighteen hundred per hour: we have no hesitation in saying it is our firm belief, that, under favourable circumstances, three thousand impressions per hour might be struck off, without in any degree straining the machinery, and that these impressions would be of a superior order of printing.

The machine is worked by one man, who turns the fly-wheel, and two boys who lay on the sheets of paper; the inking of the types, the running in of the frisket, the rising and falling of the table and form to produce the impression, and the delivery of the sheets, after being printed, into a heap above the press, are all done by the evolutions of the mechanism, which is so substantial in all its parts, that there is little risk of its derangement, and the movements are so smooth that its action would scarcely be perceived in an adjoining room, or at a few yards distance.

The specification states, that these "improvements in machinery for printing, consist in variations, additions, and modifications of an apparatus for printing, described in the specification of a patent, &c. granted 21st of March, 1822," see Vol. VI. The improvements are embraced under the following heads: 1st, a method of adjusting and fixing the form of types upon the table, and of removing the same, and replacing other forms of types with great expedition; 2ndly, adapting a stationary surface, upon which the paper intended to be printed is laid and adjusted, ready to be drawn off on to the frisket; 3rdly, a mode of obtaining register with perfect accuracy; 4thly, the means and apparatus employed for confining the sheet

of paper upon the frisket; 5thly, an interrupted gear motion, or mechanical contrivance to affect a reciprocating action, by which certain parts of the machinery are alternately put in motion, or set at rest, while the other parts of the machinery are continuing their progress; 6thly, the mode of taking off the sheet of paper after it has been printed, and delivering the sheets in succession on to a heap with perfect regularity; and 7thly, the mode of regulating at pleasure the quantity of ink communicated to the distributing rollers.

In the improved method of adjusting and fixing the form of types upon the table (instead of confining the iron frame or chase with wedges or quoins driven against raised corners of the table as heretofore) it is proposed to attach pieces of metal with angular edges, as chaps, on two opposite sides of the table, and render these chaps moveable by passing a shaft with screwed ends through them and the table, the threads of which screws being made right and left handed, cause the chaps, when the shaft turns, to approach towards or recede from each other, and thereby hold fast, or release the chase. Plate VIII. fig. 1, is a horizontal view of part of the machine, shewing the frisket frame sliding upon the rails of the machine, and the table with the chase laid upon it; *a a*, are the chaps connected together by the shaft *b*, shewn in dots, this shaft being turned by a winch placed upon either of its square ends, the chaps will open or close and thereby release or confine the chase upon the table, there being small notches previously cut in the sides of the chase for the chaps to fall into; it is hence obvious that the notches should be so cut, that when the chase is screwed up tight, the form becomes adjusted accurately.

The stationary surfaces upon which the paper intended

to be printed is placed, (called the feeding tables,) are square frames, similar to tympans, covered with cloth or parchment, these frames are seen edge-wise in fig. 2, at *c* 1, and *c* 2, and one of them at *c*, *c*, *c*, in fig. 1; they have a small rising and falling action upon pivots, and are elevated by the double levers, *z*, *z*, fig. 2, in order to allow the friskets to pass without disturbing the paper. These double levers, *z*, are worked by means of a cam wheel upon the shaft, *x*, which cam wheel, by pressing against either of the long levers, *y*, *y*, cause them (by means of the cords, *w*, *w*,) to draw the double levers, *z*, *z*, alternately, thereby raising the feeding table, as at *c* 1, which on the return of the long lever, falls by its own gravity as at *c* 2.

The mode of obtaining register is by inserting four lines of type in holes made for that purpose in the edge of the chase, or other part of the form, in such positions that if continued across, they would intersect in the centre of the form, by which means lines at right angles are printed on the four edges of the paper, and these, when the sheet is placed upon the feeding table for printing the reverse side, are to be brought to coincide with corresponding lines made upon the feeding table: the sheet will then lie in a situation to be brought on to the form, where it will perfectly register.

The method of confining the sheet of paper on the frisket, is as follows:—having placed the sheet upon the feeding table, *c*, *c*, *c*, and properly adjusted it to the edge of the paper, it will extend over, ready to be taken hold of between the frisket, *d*, *d*, and the raised fingers, *e*, *e*. The frisket having returned, and the time arrived for carrying the sheet forward on to the form, the fingers, *c*, *e*, are brought down, so as to hold the edge of the sheet upon the frisket by the following means. A bar,

f, *f*, fig. 1, to which two slides, *g* and *j*, are attached, is made to vibrate by a tappet pressing against a jointed arm, extending from the lower end of a lever connected to the bar, *f*, fig. 2. Upon the slider, *g*, there are two small inclined planes, *h*, *h*, which by the movement of that slider, pass under and raise the fingers, *e*, *e*. Let it now be supposed that the bar, *f*, has pushed the sliders back, and that in consequence the inclined planes, *h*, *h*, have passed under and raised the fingers, *e*, *e*, (which will be the case when they are about to take hold of the sheet.) When the tappet has struck the lever, so as to force the bar, *f*, back again, the slider, *g*, will be brought forward, and the inclined planes, *h*, *h*, drawn from under the fingers; now the springs, *k*, *k*, pressing upwards against the hinder parts of the fingers, *e*, *e*, cause them to come down with such force as to hold the edge of the paper securely upon the frisket. In this situation, the frisket and its frame are carried along the machine, which brings the sheet over the form ready to receive the impression.

The tappet that actuates the bar and its lever, *f*, is fixed to the toothed wheel, *l*, fig. 2, and is marked *m*; as that wheel revolves, the tappet strikes against the end of the jointed arm of the lever, *f*, and causes the bar above, and the sliders, *g* and *j*, to move as before described. It being, however, necessary, in order to effect both the backward and forward motion of the sliders, *g* and *j*, that the lever, *f*, should be alternately moved outward and inward; a rod, *n*, connected to an excentric wheel on the axle, *o*, is made to shift the jointed arm of the end of the lever, *f*, so that it may come in contact with the tappet in such positions as will alternately press the lever and its bar outward and inward, thereby shifting the sliders and raising the fingers to cor-

respond with the other movements of the machinery. As the wheel, *o*, makes an entire revolution to every change of the bar, *f*, it is obvious that the tappets which force it outward and inward, must be situated upon different circles in the wheel, and for the purpose of bringing the end of the jointed arm, *f*, into these different circles, it is required to be shifted as above described.

The interrupted gear motion, is a mechanical contrivance to effect a reciprocating action, by which certain parts of the machinery are alternately put in motion, or set at rest, while the other parts of the machinery are continuing their progress. This contrivance is shewn at fig. 3, 4, and 5, which exhibit the wheels in different stages of their revolution. A, is the wheel to which a continuous rotatory motion is given. B, the wheel intended to revolve with an interrupted motion. C, is a guide having two grooves for moveable teeth in the wheel, A, to slide along. These moveable teeth are shewn at *a*, *b*, in the periphery of the cogwheel, A. The mode of attaching these teeth to the wheel, is by forming them at the ends of levers, which levers rise and fall upon their pivots at *c*, *c*. These levers are enclosed in the hollow part of the wheel by a face plate, (which is removed in the figures in order to shew the interior,) and upon this face plate, there are certain inclined planes intended to act upon the tappet, or raised parts of the levers, at *d* and *e*. The wheel, A, being made to revolve with a continuous motion, its teeth will work in the toothed part of the lesser wheel, B, until the blank part of that wheel comes round; at which time the moveable tooth, *b*, is made to fall into the groove of the guide, and the curved part of the guide coming against a circular bead on the back of the wheel, A, the lesser wheel, B, stands still, while the larger wheel, A, continues its revolution.

Let it be supposed that in fig. 3, the lesser wheel, B, has been some time quiescent, and that the larger wheel, A, is revolving in the direction of the arrow, at the moment that the tooth, *a*, comes into the situation there shewn, the inclined plane upon the face plate, as before mentioned, act upon the tappet, *d*, and by pressing the lever down, projects the tooth, *a*, into the groove of the guide; and as the wheel, A, continues to revolve, brings the guide into the position of fig. 4, at which time another inclined plane acts upon the tappet, *e*, and raises the tooth out of the groove. It will now be seen, that the teeth of the larger and the lesser wheels are in gear, and that they revolve together, which they will continue to do until the wheel, B, comes into the position shewn at fig. 5. At this time, an inclined plane upon the face plate, as before described, pressing upon the tappet, *d*, forces the lever down, and projects the tooth, *b*, into the other groove of the guide, by which as the wheel, A, revolves, the guide and the wheel, B, are brought into the position shewn at fig. 3, and the tooth passing off at the end of the groove, leaves the wheel, B, in a quiescent state; the segment of a rim on the periphery of the larger wheel at the back, shewn by dots, sliding against the curved part of the guide, and thereby holding the wheel, B, steady; the teeth of A, passing over the blank part of B, until the tooth, *a*, comes again into the situation at fig. 3, when the wheel, B, resumes its rotatory motion.

It will be perceived, that this very ingenious contrivance for obtaining an interrupted rotatory motion, (and which is, we believe, perfectly new in mechanics,) is applicable to a great variety of machines, besides those employed for printing. It is much to be regretted that the inventor did not secure to himself its

exclusive use by a distinct patent; as it stands, however, in this specification, it is, for every other purpose except printing machinery, thrown open to the public, and we understand is about to be adapted to some improved lace-making machines, which upon a rotatory principle, are designed to work by the power of steam or water.

The method of taking off the sheet of paper after it has been printed, and of laying it upon the pile, is as follows:—Supposing the sheet to be carried in, ready to receive the impression, a bar, having two or more pairs of clasps or fingers, is brought under the edge of the platten, and made to take hold of the edge of the paper, much in the same way as described in the former specification above alluded to. This bar is shewn detached at fig. 6. *a, a,* is the fixed part of the bar, to which the clasps, *b, b,* are attached. These clasps are kept open by springs, but are closed when taking hold of the paper, by the sliding bar, *c, c.* Upon this bar, *c,* there are inclined planes, which as the bar slides, pass under the tails of the clasps and close them. The impression being given to the paper, it is drawn off by the rotation of the wheels carrying the chains to which the clasp bar is attached, and is brought over the heap as shewn at fig. 7, when an inclined plane pressing against the end of the sliding bar, *c,* above described, opens the clasps and lets the paper fall. The sheet of paper is prevented from passing too far, or being affected by the wind, by a check cloth or apron, which is suspended over it, as seen at fig. 7. This cloth is brought down, and the levers and rod which suspend it, by means of a rod and cranks connected to the axle of the chain wheel, as seen in figs. 2 and 8. By the descent of these levers and rod, the

heap of paper is pressed upon and made to descend gradually, by sliding down its standards.

In regulating the quantity of ink supplied by the ductor roller to the distributing rollers, an adjustable rod is employed, which is capable of elongating or contracting, by the turning of a screw-box; this adjustable rod is shewn in fig. 7, one end being connected to the ductor, and the other end to an excentric upon the axle of the reciprocating wheel, by which means, as the excentric passes round the ductor, it is occasionally pressed up against the distributing rollers, and held there for any space of time required for the supply, according to the length of the adjustable rod.

Having described the particular heads of this invention, it may be desirable to explain the general operations of a machine in which these improvements are combined, in order that their disposition and purposed effects may be clearly understood. Fig. 2 is a side view of the machine, the outer frame and fly-wheel being removed for the purpose of exposing the mechanism within. Fig. 7 is a view of the reverse side of the machine, the outer frame being removed, and part of the inner frame broken away to shew the interior, and fig. 8. is an end view of the machine, the same letters referring to similar parts in these three figures. The fly-wheel situate upon the axle, *a*, is to be put in motion by a winch, or otherwise, which turns the small toothed wheel, *b*, upon the same axle, and this communicates motion to the larger toothed wheel, *c*, and that to *d*, forming a train of three toothed wheels, actuated by the shaft, *a*. A crank attached to the axle of the wheel, *d*, by means of its connecting rods, moves a toothed sector, *e*, this sector takes into a pinion, *f*, and a toothed wheel,

g, upon the same axle, by these means is made to drive the frisket carriage, *h*. The traversing of this carriage conducts the inking rollers, *i*, *i*, *i*, over the form of types, and inks them ready to give the impression. The paper having been previously laid and adjusted upon the feeding table, *c* 1, the fingers, *k*, have taken hold of its edge in the manner before described, the progress of the carriage then brings the frisket with the sheet on to the form, and then the table is raised by means of the levers and rods, *p* and *q*, actuated by the small wheel, *r*, behind the wheel, *b*, which has now been brought into geer with the wheel, *b*, by means of the contrivance described in figures 3, 4, and 5.

Previous to the impression being given to the sheet, the clasps, *s*, are brought down under the platten, and are made to take hold of the sheet by an inclined plane on the side of the table striking against the tail of a lever, *t*, which moves the slider shewn at fig. 6; by these means the paper is held between the clasps, and is carried up and deposited by the revolution of the wheels, *u* and *u* 2. These wheels are actuated by a rack, *v*, attached to the side of the frisket carriage, which rack taking into the links of the endless chain, gives rotation to those wheels, as the frisket moves to and fro.

A sheet of paper laid upon the feeding table, *j* 2, is now by the return of the frisket carriage, brought over the form, ready to be printed, which operation takes place while the former sheet is drawing off, in the manner described before, by the rotation of the wheel, *d*, and its toothed sector. This wheel, *d*, stands still when the wheel, *b*, is in motion, both of them being connected to the wheel, *c*, by the interrupted gear apparatus above described, and being alternately, as respects each other, in a state of rest and motion. The inking rollers, *i*, *i*, *i*,

which are connected to, and move with the frisket carriage at every return of that carriage, rest upon the distributing rollers, *w* 1, *w* 2, that are in constant rotation, and these receive their supply of ink, which is regulated in the manner before described.

The patentee concludes his specification in these words, "Though I have described the general construction and operation of my improved printing machine, yet I have not particularized all its parts, as many of them have been before set forth in my former specification, above alluded to, consequently they are not now claimed; but the invention of certain improvements on printing machines, for which the present patent is granted, are the several contrivances embraced under the seven heads as above expressed, and which, as far as they are applicable to printing apparatus, are hereby claimed."

[*Inrolled, August,* 1824.]

To JOHN LINGFORD, *of the Town and County of the Town of Nottingham, Lace Manufacturer, for his Invention of certain Improvements upon Machines or Machinery, then in Use, for the Purpose of making that kind of Lace, commonly known or distinguished by the Name or Names of Bobbin Net, or Buckinghamshire Lace Net.*

[Sealed 20th March, 1824.]

THE machines employed for producing that particular kind of net called bobbin net, in imitation of the lace made in Buckinghamshire and its neighbourhood, by twisting the threads of a number of bobbins, round pins

upon a pillow, are of various kinds, that is, differing in the principles of their construction and movements, but all tending to the same end, that of conducting a series of bobbins in such directions as shall cause the threads to be twisted together, and form meshes of a hexagonal figure.

The different descriptions of machinery for making lace, all of which have been invented, or at least introduced within the last fifteen years, may be enumerated under the following heads. The old Loughborough double tier, *Heathcoat's*; the single tier on *Stevenson's* principle; improved double tier, *Brailey's*; single tier on *Lever's* principle; the old Loughborough improved with pumping tackle; the pusher principle; the traverse warp, *Brown and Freeman's*; traverse warp rotatory, *Lindley and Lacy's*; the straight bolt, *Kendal and Mauley's*; the circular bolt, *Mauley's*; the circular comb, *Hervey's*; the circular comb improved, *Hervey's*; and the improved levers; these comprehend the different principles upon which the machinery for making bobbin net lace have been founded. The present invention consists in a mode of actuating certain of the above machines by a rotatory power: they having been hitherto worked by a beating, or lever action of the hands and feet of the operator. These improvements apply to three different constructions of lace machines, the *Hervey's*, or circular comb machine, the circular bolt machine, and the straight bolt machine, all of which are upon the double tier principle, that is, having a double row of bobbins, crossing and interchanging between each other. It is, therefore, to be understood, that the present improvements do not apply to the internal mechanism of the machine, but simply the manner of putting them in action.

In Plate IX, fig. 1, is a front view of a machine, upon the circular bolt principle; fig. 2, is an end view of the same; and fig. 3, a section taken across the machine near the middle, the respective letters referring to the same parts in these three figures.

It will be perceived, that the machine, as exhibited in these three figures, is divested of the handles and levers by which it is usually actuated, and that it is shewn as adapted to be worked by power alone; but it is to be understood that these machines are capable of being put in motion by hand, as the improved parts, that is, the rotatory movements, may be thrown out of gear in a few minutes, and then supposing the handles and levers to have been previously adapted to it, the machine may be worked in the ordinary way.

To actuate this machine, a band from the rotatory drum of a steam engine, or other first mover, is to be brought over the conical rigger, *B*, which by a contrivance for throwing it in and out of gear (to be explained hereafter) turns the lateral shaft at the end of the machine, and that, by means of a centripetal pinion and cog-wheel, causes the main shaft of the machine to revolve. *B*, is this centripetal pinion, of a peculiar construction, which works into the periphery of an oblique toothed wheel, *a*, fixed to the main shaft, *D*, *D*, *D*. Upon this main shaft there is a central tappet wheel, *E*, intended to work the locker bars, and also two cam wheels, *F*, and *G*, which actuate the pusher bars, as will be further explained. At the end of the main shaft there is a toothed wheel, *H*, which as the shaft revolves acts as a spur wheel to turn another toothed wheel, *I*, above; upon the axle of this last mentioned wheel, and affixed to it, is a peculiarly formed wheel, *K*, carrying a series of inclined planes the edges of which take into a toothed wheel, *L*, and operate upon the same

principle as an endless screw. By means of this wheel, *K*, with the inclined planes, the toothed wheel, *L*, and its horizontal shaft, *M*, are made to revolve, and by the several cam wheels, and revolving inclined planes affixed to this shaft, *M*, the lateral sliding or shogging movements of the several bars are affected as will be further explained.

Rotatory motion being given to the main shaft, *D*, as aforesaid, the tappet wheel, *E*, is made to revolve in the direction of the arrow, fig. 3, when by the tappets or projecting parts of its periphery striking against the friction wheel at the end of the lever, *N*, that lever is made to oscillate upon its fulcrum pivots, *J*, and being attached at top by a sliding joint to the lever of the locker bar, *a*, causes the locker bar to make a stroke every time that one of the tappets strikes the end of the lever; the locker bar, *a*, being connected to the locker bar, *b*, by means of two small projecting pieces called lappers, not shewn, but which are stated to be well understood, the action of the bar, *a*, moves the other bar, *b*, and by that means the locking, as it is called, is effected; that is, the leaves of the locking bars, pressing against the tale of the bobbin carriages, *c*, *c*, causes them to slide in the curved grooves between the circular bolts, *d*, *d*. As, however, these locking bars are limited in their action, two other bars, *e*, *e*, called pusher bars, are employed to push the carriages to and from the extremities of their range in the circular grooves. These pusher bars are fixed in quadrants, *f*, *f*, at the ends of the machine, and the quadrants carrying the bars are made to oscillate upon their centres above, by means of rods, *g*, attached by joints to the arms, *h*, the latter of which are affixed to the shaft, *i*, at the back of the machine; the shaft, *i*, is made to vibrate by means of two bent levers, *O*, and *P*, attached thereto, their

extremities being raised or depressed by running against the periphery of the two cam wheels, *F*, and *G*, as they revolve.

Having explained the manner in which the locker bars and the pusher bars are actuated, the specification proceeds to describe the contrivances for shogging or sliding the bars endways; this is for the purpose of shifting the positions of the bobbins, and causing them to move sideways, that they may, when pushed through the machine again, slide in other grooves and thereby twist the threads.

At the end of the main shaft, as aforesaid, a toothed or spur wheel, *H*, (see fig. 1.) is attached, which actuates another toothed wheel, *I*, above it, and upon the shaft of the last wheel is the inclined plane wheel, *K*, which by taking into the toothed wheel, *L*, gives a rotatory motion to the lateral shaft, *M*; upon this shaft are two cam wheels, *j*, *j*, (see fig. 2.) commonly called Dawson's wheels, which as they revolve shog or slide the two guide bars, *r*, *r*, sideways; *k*, is also a wheel of the same description for shogging the front bolt bars, *s*, *s*. *Q*, *Q*, are two revolving inclined planes alternately acting against friction rollers at the end of small levers, *R*, *R*, which levers are attached to the cams, *l*, *l*, supporting the back and front point bars, *m*, *m*. By these means as the shaft, *M*, revolves, the inclined planes, *Q*, *Q*, force out the point bar, alternately at those parts of the operation, when the taking up of the twist is to be effected; and as it is necessary that the points should be withdrawn from the net in a perfectly level position, that is effected by the friction roller at the shorter end of the lever, *S*, pressing upon an arm, *T*, which stands out at the back of the point bar. This lever, *S*, is held in the level position by a small friction roller at the end of its longer arm, running upon the circular part of the cam, *U*, (see fig. 1.) but when this

friction roller descends into the lowest part of the cam, *U*, which it does as the cam comes round the shorter end of the lever, *S*, rises and permits the points to dip by their own gravity out of the level, for the purpose of taking up the twist. At this period the revolving inclined plane, *Q*, leaves the lever, *R*, and the point bar is immediately pressed forward through the threads by the force of the bent spring, *V*, when a catch, *W*, holds it fast. The friction roller at the longer end of the lever, *S*, now coming upon the circular part of the cam, *U*, presses the shorter end of that lever down upon the arm, *T*, as before, and raises the points up to the level position.

The rolling up of the net upon the work beam as it forms in the machine is effected by a wheel, *X*, upon the shaft, *M*, having semicircular notches in its periphery, over which as it revolves a friction roller at the end of a lever, *Y*, rises and falls, and in going up causes a pusher, *t*, attached to the lever, *Y*, to drive the ratchet wheel, *o*, one tooth. Upon the axle or shaft of this ratchet wheel there is an endless screw, *p*, which takes into a toothed wheel, *q*, upon the axle of the work beam, and thus as the shaft, *M*, revolves the net is by a very slow motion rolled round the beam.

The means by which the machine is stopped when going, or put in action from a quiescent state, is shewn in the detached Fig. IV, which is a horizontal section of the conical rigger, *A*, before mentioned. This rigger runs loosely upon the shaft, *a*, but may be locked to it by the friction cone, *b*; the cone slides along the shaft, but is made to revolve with it by means of ribs, which stand up on the shaft and enter grooves in the hollow of the cone. To the back of the cone a grooved pulley, *c*, is affixed, and the cone is forced up into the rigger by means of a spring, *d*, which acts at the back of the pul-

ley. Thus the cone is forced into the hollow of the rigger, which it fits accurately, and the adhesion of the two surfaces produce sufficient friction to lock the cone into the rigger and carry the shaft round with it.

It will now be seen that the locking of the cone and shaft to the revolving rigger, *A*, causes the centripetal pinion, *B*, affixed to the end of the shaft, to revolve with it, and this pinion taking into the teeth or indentations of the cog wheel, *C*, gives rotatory motion to the main shaft, *D*, *D*, *D*, and that to the other parts of the machine as already described.

A rod, *u*, *u*, (seen also in the front view of fig. 1,) has attached to its extremity an inclined plane, *e*, which by the lateral sliding of the rod, *u*, is brought against the side of the grooved pulley, *c*, and if the action of the machine is to be stopped the workman slides the rod, *u*, to the left, when the inclined plane, *e*, pressing against the side of the grooved pulley, forces the cone back away from the rigger, and thereby takes off the friction which caused it to revolve; the rigger now slides freely round upon the shaft, while the shaft itself and the other parts of the machine remain stationary.

The pressure of the cone against the inside of the rigger, is intended to be such as will just produce friction enough to overcome the resistance of the machinery to be actuated, for this purpose the spring, *d*, must be carefully tempered and adjusted, when should any of the carriages get into an improper situation, the increased resistance thereby caused, will overcome the friction of the cone and stop the machinery immediately. A fly-wheel may be attached to the shaft as at *f*, or it may be attached to the rigger, the object of which is to overcome the dead points of the several cams, and cause the whole to move smoothly.

The centripetal pinion, B, may be formed by any number of curves working parallel to each other, and these curves may be segments of any radius, according to the required speed, the toothed wheel into which the segments take being cut with oblique teeth, at such distances apart as the segments are when measured in a direction radiating from the centre. The centripetal pinion, B, shewn in fig. 1, has four curves, which take into a wheel with twenty teeth; the speed of the pinion, therefore, in this instance, will be five to one of the toothed wheel, and the power by which the main shaft is turned will be in that proportion.

In the foregoing description, the invention is adapted to a machine upon the circular bolt construction; but the movements of a Harvey's, or circular comb machine, being upon the same principle, may be worked by similar contrivances to those exhibited in the figures, that is, a tappet-wheel attached to a revolving shaft, may be employed for moving the levers which actuate the locking bars, and also cams for moving the pusher bars, which are similar operations to those described in the circular bolt machine, and have the same effect. The end movements, that is, the shifting or shogging of the bars, may be effected in the circular comb machine exactly as described in the circular bolt machine, and in which the revolving inclined planes are to be employed to bear against the levers, for the purpose of bringing out the point bars, also the revolving cams for pressing up the points, and likewise the wheel, with semicircular recesses, which moves a lever, that causes the work to be progressively wound round the beam; all which contrivances are so fully shewn in the drawings and description, that a representation of a circular comb machine

with these parts adapted to it, is stated to be altogether unnecessary.

The straight bolt machine varies considerably in its movements from the foregoing, though similar in its ulterior effect, it is, therefore, thought desirable to shew the manner in which these improvements are attached to that machine, so as to actuate it by a rotatory movement, instead of working by the hands and feet of the operator as usual. Fig. 5, is an end view of a straight bolt machine. Fig. 6, a section of the same. *a*, is a horizontal shaft extending along the machine, and which is made to revolve by means of the conical rigger actuating a centripetal pinion, the curved projections of which take into a toothed wheel upon the end of the shaft, *a*, in the manner before explained and exhibited in fig. 1 and 4. Rotatory motion being thus given to the main shaft, *a*, the projections on the tappet-wheel, *b*, strike the lever, *c*, of the locker bars, *d*, *d*, six times in every revolution, the work wheels being cut suitable for twelve motions to complete the mesh, and the cam wheels, *e* and *f*, as they revolve, alternately push the levers, *g* and *h*, which being attached to the shaft, *i*, cause that shaft, by means of the lever, *k*, to give the traversing motion to the body of the machine. At the reverse end of the shaft, *a*, to that where the rigger acts, another centripetal pinion, *l*, is attached by taking into a wheel, *m*, with eight teeth, upon a vertical shaft, *n*, causes that shaft to make one revolution, while the main shaft revolves twice. At the upper end of this vertical shaft, *n*, a snail, *o*, is fixed, which as it revolves alternately, strikes one of the levers, *p*, *p*, attached to the point bars, *q*, *q*, and by these means the points are drawn out of the meshes ready for taking up. The machine

exhibited in the figs. 5, and 6, was constructed to move by the agency of the hands and feet, and is in no respect altered, excepting in the introduction of the improved parts for working it by rotatory power, and it may, like the former machines, be changed at pleasure, and actuated by either means. The vertical shaft, and its appendages, may be adapted to some descriptions of circular comb machines and circular bolt machines, (viz.) those which have the work wheels in front; under such circumstances, therefore, it is proposed to adapt this shaft, and its snail for moving the point bars, or such other snail, or excentric wheel, as the peculiar modifications of the machine may require. The tappet wheels and cams are shewn in the figures of such forms as are adapted to the machinery which they have to move, but a slight variation in the dimensions and positions of the parts of the different hand machines now in use would cause the tappets and cams to be altered; it would be impossible to describe any invariable rule by which they should be formed, and in adapting them to old machines, it is simply necessary to attach a plane wheel to the revolving shaft, and mark the points of action to which the periphery of the cams or tappets should be cut.

In the several views in Plate IX., many parts of the machines are shewn which are not new, and are consequently not intended to be claimed; the patentee has, therefore, thought it necessary to state, that his claim of invention consists in the adaptation of the rotatory contrivances, above described, to hand machines of the three principles, called the circular bolt machine, the Harvey's circular comb machine, and the straight bolt machine; also in the adaptation of the conical rigger, and its appendages; the centripetal pinion, and the wheel with inclined teeth, which it takes into; the inclined

plane-wheel, for obtaining a right angle gear; the revolving inclined planes upon the lateral shaft, for drawing out the point bars; and the revolving snail wheel upon the vertical shaft, for the like purpose, when such several contrivances are applied to other descriptions of lace machines, actuated by a rotatory power; and lastly, in the application of the levers worked by cam wheels, for pressing up the point bars in taking up the twist, which are applicable to various constructions of lace making machines, whether actuated by hand or by rotatory power.

[*Inrolled, September*, 1824.]

To JOSEPH BARLOW, *of the New Road, in the Parish of St. George, in the East, in the County of Middlesex, Sugar Refiner, for his new invented Method or Process for Bleaching and Clarifying, and improving the Quality and Colour of Sugars, known by the name of Bastards and Piece Sugars.*

[Sealed, 15th March, 1825.]

THE syrup extracted from the cane in the West Indies, is boiled to a consistency, which produces that crystallized article called Muscovado sugar, (the superior quality of moist sugar,) the runnings from which, is the West Indian molasses sent to Europe in puncheons. This molasses, when boiled here, produces the brown sugar, called in the trade bastards.

The ordinary mode of making bastard sugar from

the West Indian molasses, is by boiling the molasses in pans or coppers, until the aqueous parts are in a great measure evaporated, then removing the liquor from the pan by means of ladles, and pouring it into earthen moulds of a conical figure, where the remaining molasses descend to the bottom of the vessel, and leave the sugar above in a crystallized state. After a day or two, the lower end or apex of each conical mould is opened, and the molasses allowed to run out into a pot, leaving only the crystals of sugar in the mould, which in that state is called bastard sugar.

In order to clarify and bleach this sugar, the tops of the moulds are coated, a few inches thick, with a solution of clay in water, stirred up to a stiff consistency, and as the water descends from the clay through the sugar, (which usually takes about a week,) the colouring matter is absorbed by it, and passes off in the state of a thick brown syrup, or molasses, at bottom, leaving the sugar above considerably whitened; but in this process, a portion of the sugar itself is dissolved and taken up by the water, and consequently the quantity remaining in the mould becomes reduced, and the syrup or molasses, which thus runs from the moulds, being sold at a small price, causes a very considerable loss to the maker.

To obviate this objection in the ordinary process, and save that portion of sugar which usually descends into the molasses, or syrup, the present invention is proposed, which consists in employing a quantity of molasses in which that article is received from the West Indies, as a bleaching material, instead of the clay and water.

The bastard sugar being in a crystallized state in the mould, as above described, with the colouring matter in it, it is proposed to pour upon the top of the bastard in the mould, a quantity of the West Indian molasses,

when, after a few hours, it will have passed through the mass, and have carried the colouring matter with it, without reducing the quantity of sugar that had been previously crystallized in the mould. If the molasses should happen to be too thick for the purpose, it may be reduced by the addition of a quantity of water; experience alone can determine the suitable thickness.

There are three modes of producing bastard sugar, (viz.) boiling the West Indian molasses by itself; boiling the syrup which runs from the process of refining or making lump sugar and boiling the said syrup or West Indian molasses together. It sometimes happens that broken lumps, which is called piece sugar, is mixed with the molasses to assist the crystallization; whatever, therefore, be the mode by which the sugar is produced, the improved mode of clarifying and bleaching appears, the claim of the patentee being the employment of molasses for extracting the colouring matter from sugars in the manner above described.

[*Inrolled, September,* 1825.]

To THOMAS MAGRATH, *of Dublin, for his new invented and improved Apparatus for conducting and containing Water and other Fluids, and preserving the same from the effects of Frost.*

[Sealed, 11th January, 1825.]

THE improvement herein proposed consists in coating the pipes or other vessels employed for the containing or conducting water with pulverized charcoal, or some such imperfect conductor of heat; when the water in

such vessels being surrounded and excluded from the action of the atmosphere, its caloric cannot be abstracted by reason of the non-conducting properties of the coating; it is, therefore, prevented from freezing, and is preserved in its fluid state, however low the thermometer may stand in the open air.

The apparatus is simply a double pipe, that is, an ordinary pipe with a jacket surrounding it, which are kept from contact with each other, by small collars or wedges of cork, or rolls of woollen, placed between the two, and the spaces or vacancies are filled with pulverized charcoal. There may be two, three or more pipes, one within the other, and the spaces between them occupied with the non-conducting materials, which will effectually prevent the abstraction of the matter of heat, by which the water is kept in a fluid state.

In a similar way, water tanks or cisterns may be constructed, by making their sides, top and bottom double, and introducing the pulverized charcoal, or such material between the two; by these means the fluidity of the water will be preserved under all temperatures.

The patentee does not confine himself to any particular form of apparatus, but claims, as coming within the principles of his invention, any kind of vessel for containing or conducting water, which shall be coated or surrounded with a non-conducting material as above stated.

Inrolled, July, 1825.

To DAVID EDWARDS, *of King Street, in the Parish of St. George, Bloomsbury, in the County of Middlesex, Writing Desk and Dressing Case Manufacturer to His Majesty, for an Inkstand, which is so constructed, that by means of Pressure the Ink is caused to Flow for Use.*

[Sealed, February 26, 1825]

THIS new invented ink-stand, is so constructed, that by turning the top in one direction, the ink is made to flow from the interior into a small cup, on the side of the lower part of the inkstand, and by turning the top the reverse way, the ink flows back again, from the cup to the interior.

Plate X. fig. 24, represents the external appearance of the ink-stand complete, and fig. 25 is a section of the same, taken perpendicularly through the middle, the similar letters referring to the same parts respectively in both figures; *a*, is the external cylinder, or case, made of metal or any other suitable material, which encloses a glass or porcelain cylinder, *b b*, exactly fitted to the case, and made fast thereto by plaster of Paris or any other thin adhesive composition. In this glass or porcelain cylinder, a quantity of loose horse-hair and wool is placed, and ink poured upon it, which becomes absorbed by the loose horse-hair and wool, and is thereby retained in the interior of the ink-stand.

At the lower part of the glass or porcelain cylinder, an aperture, *c*, is made, through which the ink is to be forced by pressing the horse-hair and wool; *d*, is a hollow tube attached both to the outer and inner case, on the side of the inkstand, opposite to the aperture, *c*,

into this tube, the cup, *e*, is screwed, its lower extremity being open to the interior of the hollow tube, and the joints are all made perfectly tight.

On the upper surface of the wool and horse-hair, a disc of glass, *f*, is placed, its periphery exactly fitting the interior of the glass or porcelain cylinder. The outer case of the ink-stand is covered by a cap, *g*, which screws on to the upper part, and on the top of this cap the box, *h h*, is attached. Within the box, *h*, is the sliding tube, *i i*; *k*, is a central shaft, attached to the top piece, *l*, by its square head entering a square aperture in the top piece, and which is made fast thereto by a nut. This central shaft has a screw thread cut round it, which works in a hollow screw at the upper part of the sliding tube, *i*, and by the top piece being turned, the shaft drives the sliding tube, which, by pressing upon the top of the glass disc, forces it down, and thereby compresses the horse-hair and wool, and causes the ink to be driven through the aperture up the tube, *d*, into the cup, where the supply is furnished for writing; and when done with, the top piece is turned the reverse way, which raises the sliding tube, and the elasticity of the wool forcing up the glass disc, the ink is permitted to flow back again, and remain secure in the interior.

[*Inrolled April*, 1825.]

To William Turner, *of Winslow, in the County of Chester, Saddler, (being one of the People called Quakers) and* William Mosedale, *of Park Street, Grosvenor Square, in the County of Middlesex, Coach Maker, for their new Invented Improvements on Collars for Draught Horses.*

[Sealed, April, 1825.]

These improvements on collars for draught horses, consists in bringing the internal part of the leather, which contains the stuffing on the inside of the collar, over the front of the wale, the objects of which are to give stability to the hinder part of the collar, by means of tension, which prevents it from bending backward away from the shoulder of the horse in using; and also to afford elasticity and softness to all those parts of the collar which come in contact with the horse's neck.

The manner in which these objects are carried into effect, will be seen by reference to plate X. and following description: fig. 21 is a view of the front of one of the improved collars; fig. 22, a back view of the same, and, fig. 23, a section cut through the thickest part of the collar at the shoulder; the respective letters referring to the same parts in these three figures.

The wale, *a*, is first to be formed of stiff leather as usual, and to be stuffed with straw, leaving a strip or flap of leather along the wale, for the purpose of attaching the body part of the collar. The cloth, *b, b*, is next to be sewed to the said strip or flap of the wale, and to be brought round the outside and inside to the front part over the wale; this cloth forms the body of the collar, and is to be stuffed with rye straw as at *c*, and a

portion of curled hair next the inside part, as at *d*. A thin layer of flock or wool, is then to be placed, as at *e*, upon the cloth on the inside of the collar, and is to be covered with soft leather, forming a smooth curved surface from the back part of the collar to the front part of the wale. After this, the external leather and decorations may be attached by pasting and stitching as usual, and the complete collar will appear, as shewn in the figures 1 and 2.

The patentees do not *confine* themselves to the materials of which these improved collars are proposed to be made, but recommend them as the best that they know of: the invention consisting principally in the mode of construction, (viz.) bringing the stuffing round on the inside of the collar, in front of the wale, so as to cover it; by which means they obtain a tension that prevents the collar from bending backwards, and afford a soft or elastic resisting surface, to bear against the neck and shoulders of the horse, which at all times prevents galling.

[*Inrolled, June,* 1825.]

To John Beacham, *late of Paradise-street, Finsbury-square, but now of the Strand, in the County of Middlesex, Cabinet Maker, for his Invention of certain Improvements in Water Closets.*

[Sealed 19th February, 1825.]

These improvements in water closets, consist in a method of working the valve through which the soil and water is discharged, by means of a spring barrel and its

appendages, as will be seen in Plate X. fig. 19, which represents a portable chamber-convenience, with the improvement connected thereto, all shewn in section. Fig. 20, is a section of the external vessel, only the improved parts of the apparatus being exhibited in a complete state. *a*, is the pan as usual, at the bottom or throat of which the dish valve, *b*, is placed and held by means of a lever, *c*, jointed to the standard, *d*. At the lower part of the standard an arbour, *e*, is affixed, to which one end of a convolute spring, *f*, is made fast, and after coiling several times round, the other end of the spring is attached to the box or barrel. Upon the periphery of this barrel, a stem, *g*, is fixed, which supports an anti-friction roller, *h*; this roller acts against the inclined plane on the under side of the lever, *c*, and by the force of the spring keeps up the valve.

The soil or water, when deposited in the pan, causes the lever with the dish valve to descend, as shewn by dots in fig. 20, after which, the force of the convolute spring, *f*, carries the barrel back to its former position, and the friction roller, *h*, as the stem rises, running against the inclined plane, lifts the lever, and brings the dish valve again into its horizontal situation.

In order to regulate the force of the spring, a ratchet wheel, *i*, is fixed upon the square end of the arbour, *e*, which ratchet being turned round until the spring is sufficiently wound up, is then held fast by the pall, *k*, and let fall into one of its teeth.

The contrivance is shewn in the figures attached to a portable vessel as a chamber convenience, and for that reason a rim descending from the seat is made to pass into a groove filled with water, by which means an air-tight joint is produced; but the improvement is applicable to water closets generally, and may be attached

thereto without materially altering its construction, or in any degree varying its principles. The patentee says, in concluding his specification, "I wish it to be particularly observed, that my improvements in water closets, consists in the adaptation of the convolute spring-barrel; the stem with its anti-friction roller; and the inclined plane upon the lever, as above described; by which contrivance, the anti-friction roller working against the inclined plane, on the under side of the dish valve, allows the valve to open when loaded with soil or water, and after that has passed down into the lower receptacle, to close again by the power of the spring."

[*Inrolled, April,* 1825.]

To RICHARD WHITECHURCH *and* JOHN WHITECHURCH, *of Star Yard, Carey-street, Chancery-lane, in the County of Middlesex, Carpenters and Joiners, for their having Invented or found out an Improvement upon Hinges, (which Hinges may be made of Iron, Steel, Brass, or other Metals,) for Doors, Cupboards, and Sashes of Houses, Sashes of Book-cases, and Shew-cases, and are applicable to all Purposes where Hinges are used, and particularly to the Doors and Windows of Ships, Vessels, Steam-boats, and other Craft, which will enable the Doors and Sashes to be opened on the right and left Jamb, (changing the Hinges,) and if required they can be fitted either with or without a rising Hinge.*

[Sealed, 17th March, 1825.]

THIS very ingenious contrivance is designed to enable doors, windows, or glass-cases, to open to the right hand

or to the left, as circumstances or convenience may render desirable; for this purpose the hinges are made to separate, that is, the wing of the hinge affixed to the door, to come apart from the wing affixed to the door post or jamb. It is hence necessary to attach the parts of these hinges to each side of the door, and to each jamb, and to connect the upper hinges, upon which the door swings, by cross-arms, or bars, that lead from the hinge on one side to the hinge on the other side, and which bars are respectively brought into action, as the door opens to the right or to the left.

The construction of these hinges cannot possibly be understood, without figures exhibiting them put together and in action, and in detached pieces, shewing the several parts of the invention in detail, such figures are, therefore, represented in Plate X.

Fig. 1, exhibits a closed door and its jambs, with the improved hinges attached. Fig. 2, shews the door opened to the right hand. Fig. 3, the same opened to the left hand. Fig. 4, is a view of the double hinge and cross-bars, as seen on the top side, detached from the door, upon an enclosed scale. Fig. 5, is the same seen in front. Fig. 6, a front view of the *upper* bar, with the portion of the two hinges attached at its extremities. Fig. 7, is a front view of the *lower* bar, with the portions of the two hinges attached to its extremities. It will be seen by these two last mentioned figures, that the knuckles or joints of the hinges lock into each other by means of hooks, or half cylindrical pieces, *a*, *a*, which take hold of the pins or axles, *b*, *b*, and thereby link the two together.

Fig. 8, is a representation of the knuckle or joint of the hinge, when the door is opened to the left hand, and on which the door swings, as seen at fig. 3: the top view

of the double bars and hinges opening in this way, is shewn at fig. 9. Fig. 10, represents the knuckle joint, when the door is opened to the right, as seen in fig. 2; the hook or half cylindrical piece, *a*, embracing the pin, *b*, so as to form the joint. Fig. 11, is a top view of the double bars and hinges detached, opening to the right.

When the door is opened to the right hand, the outer end of the upper bar, with part of the knuckle and the hook, draws away from that portion of the hinge which is fixed to the left hand jamb, and the door swings, carrying the upper bar with it, upon the inner hinge joint, formed by the hook, *a*, of the swinging bar, embracing the pin, *b*, of the stationary part of the hinge, on the right hand jamb. When the door opens to the left hand, the end of the lower bar, with part of the knuckle and the hook, draws away from that portion of the hinge which is fixed to the right hand jamb, and the door swings (carrying the lower bar with it) upon the hinge, formed by the hook embracing the pin of the stationary part of the hinge on the left hand jamb.

Having thus exhibited and explained the construction of the improved hinges, their mode of attachment to a door intended to open either to the right hand or to the left, and the manner in which they act, the specification proceeds to describe certain other appendages that are essential to the perfect action of the foregoing.

At the lower, or some other convenient part of the door, secondary hinges are attached for the purpose of enabling the door to swing in an erect position; these are made by fixing to the jambs the pieces, *c, c, c, c*, figs. 2 and 3, which are half hinges, as shewn detached at fig. 12, and to the door the hooks, *d d*, shewn detached at fig. 13. When these are brought together as in fig. 14, they form perfect hinges, which is the case

when the door is closed, as at fig. 1; and it is evident that the hooks may be withdrawn from the pins, so as to separate the parts of the hinge by pulling in a straight direction, but if turned round in the smallest degree, the hook will embrace the pin, and form the hinge joint.

Thus it will be perceived, that on taking hold of the right hand knob or handle, *e*, of the door, fig. 1, and drawing it forward, the parts of the hinges on the right hand side will be separated, and the opening door will swing on the left hand hinges; or on taking hold of the left hand knob, *f*, the hinges on that side will separate, and the door will swing on the right hand hinges.

In order to prevent the door from falling away from the hinges, a locking-bar is introduced, as seen at fig. 1. This bar, which is shewn detached in figs. 15, 16, has a jointed tooth, *g*, at each end: one of these teeth is to be passed into a socket in the jamb of the door, for the purpose of locking that side; the door therefore must then open on the reverse side, swinging upon the joint of the bar and tooth as a hinge. This bar may be slidden by hand, either to the right or left, but the patentees prefer in most cases to connect its action with the knobs of the door locks.

The locks that are proposed to be used are of the Mortimer kind, one of which is shewn at fig. 17, and the same with the face plate removed at fig. 18. Upon the spindle of the knob a lever is fixed, by which the bolt of the lock is drawn back, the lower end of this lever acts against a swinging lever, *h*, by which the bar is slidden. At the back of the sliding bar two pins, *i i*, project, which are respectively passed into the slots of the swinging lever, *h*, of the locks on each side. It will hence be seen, that by turning the knob of the right hand lock, the swinging lever will be thrown into the position shewn

by dots in fig. 1, and that the sliding bar will be drawn to the left, causing its tooth to lock into the left jamb, and thereby to form a hinge upon which the door opening to the left will swing. When the door is closed, and intended to be opened to the right, the knob of the left hand lock being turned, will, in the same way as above stated, cause its swinging lever to shoot the sliding bolt to the right, locking its tooth into the right hand jamb, when the door opening to the right will swing upon the joint of the bar as a hinge.

The patentee concludes by saying,—"We have described our improved hinges as affixed to DOORS; the same may, with very slight modifications, be adapted to windows, glass cases, and a variety of other situations, where hinges are required; we therefore claim the exclusive right of making and affixing such improved hinges wherever they may be applicable, and also of varying their positions as circumstances may render desirable. We have represented the detailed figures of our improved hinges (in the specification) upon a scale of half the real size; but we do not mean to confine ourselves to those particular dimensions, as the hinges may be made larger or smaller, without deviating from the principle of our improved construction; and the said hinges and their appendages may be made of brass, iron, or any other material suitable for that purpose."

[*Inrolled, May*, 1825.]

Novel Inventions.

New Steam Carriage.

We understand that Messrs. Burstall and Hill, of Leith, are upon the point of completing a travelling car-

riage to convey passengers on ordinary roads, which is to be propelled by the power of steam. The principal novel feature in this invention, is the construction of the boiler, by which it is expected that a much greater quantity of steam may be generated than by ordinary boilers. The water is injected on to a heated surface immediately over the furnace, when it instantly flashes into steam of high pressure, and passing round the furnace, proceeds thence through a twisted tube, to the induction aperture of the engine. The injection of the water into the generator or boiler, is effected by the pressure of air condensed upon its surface within the reservoir, by means of a pump, the action of which is connected with the working of the engine, and the twisted tube for conducting the steam is contrived for the purpose of affording elasticity, and allowing it to accommodate itself to the motion of the carriage upon its springs. There are some other novel points in the detail of its construction, which need not be mentioned here, as we purpose, if the carriage should be in operation within two or three weeks, to give the particulars of its construction, with a plate, in our next, or at a very early period.

New Construction of Boiler.

Mr. W. H. James, whose steam carriage we described in our ninth Volume, page 225, is about to introduce a new kind of boiler for the generating of steam to be adapted to his improved carriage; it is stated that the experiments which have been tried are extremely satisfactory, and that he entertains no doubt of being able, not only to propel his carriage upon ordinary roads,

which may be nearly level, but also that he shall be enabled to ascend hills that rise three inches in a yard.

Mr. James has also lately made some very simple and useful improvements upon rail roads, and the carriages to be employed thereon, by which he is enabled to pass along curves, and turn corners upon the line of railway, without experiencing any increased friction from the drag of the wheels. This is effected by forming the peripheries of the wheels with several elevations, and making those parts of the line of rails where the turns are to be made, to correspond with the wheels, when by bringing larger diameters of the wheels on one side of the carriage, to act upon the rail at the turns, the carriages are made to run in a curved track.

Another part of the invention is a series of train carriages, attached to each other, and drawn by a locomotive engine, having the rotatory power of that engine communicated to the wheels of all the train carriages, by a series of rotatory shafts, connected together by universal joints; the advantages of which are, that the moving power is applied to the wheels, so as to make them propel each carriage independently, instead of all being drawn by the first; and likewise that the rotatory power is, by means of the universal joints, communicated through the whole train, even though they are moving in a curved direction, or the shafts forming angles with each other.

Improvements on Keyed Wind Musical Instruments, Invented by Mr. C. Pommer.

I INCREASE or diminish the strength of the tones so as to produce a swell, and the contrary, and give the forte

or the piano at pleasure, either suddenly or gradually, in a very sweet manner, resembling the swell of the Æolian harp. My improvement is peculiarly applicable to those instruments in which the tones are produced by means of elastic metallic tongues, which are made to vibrate by a current of air striking them in its passage through grooves which the tongues cover. If a current of air is given by bellows of the common construction for organs, there will be but one uniform tone to each note, without that beautiful swell so much admired in the forte, and destitute of that delicate soft tone which is so delightful in piano passages. But by my improvement, the performer may manage the swell at pleasure; may gradually increase it as if wafted on the swelling breeze, or let it die away like the gentle expiring zephyr. My improvement consists principally in applying two single, instead of one double bellows. In the double bellows used in organs, the middle partition board is fixed immoveably to the case or frame of the instrument, with a valve on it, opening into the upper compartment; so that when the bottom board is worked, the wind forces up the upper board, which, being pressed down by a weight, gives a steady stream of air to the wind chest, but can produce no swell. Instead of the above, or in addition to it, I place two bellows of a single construction in such a position, that they may be worked alternately, or both at the same time. The upper boards or backs of these bellows are fixed stationary to two ribs or supporters, which are connected with the case of the instrument, whilst the belly or under boards move in working them. There may be one or more folds in the ribs, for working these bellows. I have a clamp or clasp, made of iron or other suitable substance, which passing over the top and down each

side, with a return, grasps the bottom board of the bellows. One of these is connected with each of the bellows, so that when the clasp is drawn upwards it raises the bottom board, and thus works the bellows. On the upper fixed board I have a post or stud placed to support the fulcrum of a lever, one end of which raises the clamp to work the bellows, and the other end is connected by a cord, chain, strap, or rod, with the pedal. Or, instead of a simple or compound lever, I have an arc on one end of the lever, over which a cord or chain passes to the clamp, and is attached to it. Or instead of this I have a wheel or wheels, a pulley or pullies, over which the cord, strap, or chain, passes from the clamp to the pedal. Or the bellows may be worked by a rod, strap, &c. rising from the end of the bellows, and uniting with the lever, arc or wheel; or in any other way which is most convenient, or which will effectually accomplish the end designed.

There may be two or more bellows, with two or more pedals, if required. The fixed upper board of the bellows, would be better to stand in an inclined position, to an angle of about thirty degrees, more or less, according to the number of folds in the ribs, or width which the bellows open, the under board or belly being in a horizontal position when fully open. It must be seen, that these bellows being single, and having no upper compartment for the wind to pass into, and consequently not pressed out by the uniform force of a weight, may be forced against the tongues with increased or diminished strength, at the will of the performer, so as to produce the swell, or the contrary—and having two of these bellows with a pedal to each, the action of the air may be kept up. If it is desired to

play, with uniform tunes, without the swell, there may be an additional bellows, similar to those of the organs.

American Journal of Science.

Polytechnic and Scientific Intelligence.

Abstracted Report of the Select Committee of the House of Commons, on Machinery and Artizans, &c.

(Continued from the preceding Vol. page 330.)

MESSRS. DONKIN, BRAMAH, TAYLOR, MAUDSLEY, and HAGUE, further examined.

Mr. Taylor considered that many of the workmen who went abroad, either from freak, or the prospect of great gains, would be glad to return if the penal laws were repealed; he had endeavoured to assist them by application to the British ambassador at Paris, who promised to grant passports to such as solicited them, but the men are generally afraid to return. If the laws were repealed, few besides the worst workmen would be induced to quit their own country, and they only from the prospect of increased wages.

Mr. Donkin considered that by the repeal of these laws, there would be less employment for them on the continent. Mr. Bramah stated, that it was necessary to workmen abroad, to set up the machinery that they have made here, and he does so frequently knowing it to be in violation of the law. If they were at liberty to go or stay, they would be less likely to emigrate permanently, and the chance of other countries rivalling us would be diminished.

All the witnesses agreed that the moral character and habits of working mechanics had considerably improved within the last twenty years; drunkenness is less frequent, scarcely ever habitual. An opinion prevails amongst the best workmen, that the cultivation of scientific knowledge is very essential to their excelling in their several branches, and they accordingly take pains to be instructed.

Mr. Maudsley considered that there is less drunkenness in the manufactories abroad than here. Mr. Donkin believed that their general character abroad was indolence. Most working men now in this country belong to benefit clubs, which lead to economical habits. Mr. D. considered that the improved moral state of the workmen was greatly conducive to their superiority as engineers over foreigners—he has workmen in whom he can place the greatest reliance; it frequently happens that the men suggest very great improvements. The improved habits of the men is to be attributed to better education, and a just notion of moral obligations and social duties. The reason why the best workmen generally go abroad is because they are selected from a previous knowledge of their ability. Several that have been sent to put up machinery have remained; two of Mr. Hague's workmen did so, and established manufactories, one at Aix-la-chapelle, the other at Vervais, where they are making steam-engines. The men generally consider themselves legitimately employed when they go out to put up machinery for their masters, but they generally pass themselves as farmers or some kind of husbandmen; they do not generally know that their property is subject to be confiscated, and that they cannot hold or claim a bequest under any will or power.

As to the laws against combining to raise wages, or

regulate the hours of working, they have very little effect among engineers and mill-wrights; they are of no use to the masters, but create a bad feeling between the workmen and their employers.—All the witnesses were of this opinion. The men are mostly paid according to their talents and ability to execute work. There have been instances of punishing the men in engineers' establishments for combining, but not by any of the witnesses. Previous to the repeal of the statute of Elizabeth, some of the masters have been prosecuted for employing men who were not entitled to work. The meetings of masters to regulate wages have seldom had the effect intended. It is not considered that the existing laws have kept wages low, they have rather tended to tie the bond of union among the men firmer, Strikes for wages have often taken place, and the demand has not been unreasonable for good workmen, but the demand for uniformity of wages has been unreasonable. Among engineers the men have always succeeded, which has arisen from the great demand for machinery; the price of labour in that profession has been increasing for some years. The combination laws are quite without effect among engineers, as the masters have no inclination to disturb a good understanding with their men.

The witnesses all stated that they apprehended no evil, but much good, from a repeal of the combination laws; there has been no combination among the master mill-wrights and engineers in the neighbourhood of London for many years, and for that reason there is a better understanding existing between them and their men than in most other trades. Each party should be free to make their engagements, and the laws of the land are sufficient to bind them. If the men agree to work by the week, they must fulfil their engagement to the

end of the week. Mr. Taylor had some men enticed away, but they were overtaken on the road to Dover, and brought back because they had not fulfilled their contract to work the week out. They, however, thought better of their intended emigration, and continued to work afterwards, and the best possible feeling exists between them and their master. The master has the same call upon the man for the fulfilment of his engagement, as the man has upon the master for the payment of his wages. If the adjustment of engagements were left to the parties without any combination laws, it would be the best mode of conducting such business.

A new Method of Bleaching Sponge for the Toilet, by M. Vogel, (translated from the French.)

To bleach sponge and render it perfectly white, it is necessary to soak it in cold water, but if it does not become soft, it must be immersed in boiling water, but this should, if possible, be avoided, for it has a bad effect on the sponge, particularly in cooling, it causes it to shrink and to become hard, and so tough as to prevent its being bleached; but if the sponge is soaked in cold water, and that water be changed three or four times every day, and every time the water be drawn off the sponge should be pressed perfectly dry; this process being repeated for five or six days, it will at the expiration of that time be ready for bleaching.

If the sponge, as is frequently the case, should contain small pieces of chalk and shells, which cannot be got out without tearing it; the sponge must be soaked for twenty-four hours in muriatic acid, with twenty parts of

water, which will cause an effervescence to take place, and carbonic acid gas to be liberated, when the shells and chalk will become perfectly dissolved. After that it must be carefully washed in fresh water, and immersed in sulphuric acid, the specific gravity of which must be 1,024 or 4° on the hydrometer of Beaumé. The immersion of the sponge in this acid should continue for about eight days, but it must occasionally be pressed dry, and thoroughly washed. After having been perfectly washed and cleaned, it should be sprinkled with rose water to give it a pleasant smell, which completes the process.

On the Employment and Working of Animal Horn in general. By M. VALLET, *(translated from the French.)*

HORN, particularly of oxen, cows, goats, and sheep, is a substance soft, tough, semi-transparent, and susceptible of being cut and pressed into a variety of forms; it is this property that distinguishes it from bone. Turtle or tortoise shell seems to be of a nature similar to horn, but instead of an uniform colour, it is variegated with spots.

These valuable properties being known, renders horn susceptible of being employed in a variety of works fit for the turner, comb and snuff-box maker. The means of softening the horn need not be described, as it is well known to be by warmth, but of the cutting, polishing, and soldering it, so as to make plates of large dimensions, suitable to form a variety of articles, may be desirable. The kind of horn most to be preferred is that of goats and sheep, from its being whiter and more transparent than the horn of any other animals. When

horn is wanted in sheets or plates, it must be steeped in water, to be able to separate the pith from the kernel, for about fifteen days in summer, and a month in winter; and when it is soaked, it must be taken out by one end, and well shook and rubbed in order to get off the pith; after which, it must be put for half an hour into boiling water and then taken out, and the surface sawed even lengthways; it must again be put into the boiling water to soften it, so as to render it capable of separating; then with the help of a small iron chisel it can be divided into sheets or leaves. The thick pieces will form three leaves, those which are thin will form only two, whilst young horn, which is only one quarter of an inch thick, will form only one. These plates or leaves must again be put into the boiling water, and when they are sufficiently soft, they must be well worked with a sharp cutting instrument, to render those parts that are thick even and uniform; it must be put once more into the boiling water, and then carried to the press.

At the bottom of the press employed, there must be a strong block, in which is formed a cavity of nine inches square, and of a proportionate depth, the sheets of horn are to be laid within this cavity, in the following manner at the bottom, first a sheet of hot iron, upon this a sheet of horn, then again a sheet of hot iron, and so on, taking care to place at the top a plate of iron even with the last, and the press must then be screwed down tight.

There is a more expeditious process, at least in part, for reducing the horn into sheets, when it is wanted very even. After having sawed it with a very fine and sharp saw, the pieces must be put into a copper used for the purpose, and there boiled, until sufficiently soft, so as to be able to be split with pincers: then bring

quickly the sheets of horn to the press, where they are to be placed in a strong vice, the chaps of which are of of iron and larger than the sheets of horn, and screw the vice as quick and tight as possible, let it then cool in the press or vice, or it is as well to plunge the whole into cold water. The last mode is preferable, because the horn does not dry up in cooling. Now draw out the leaves of horn and introduce other horn to undergo the same process. The horn so enlarged in pressing is to be submitted to the action of the saw, which ought to be set in an iron frame, if the horn is wanted to be cut with advantage, in sheets of any desired thickness, which cannot be done without adopting this mode. The thin sheets thus produced must be kept constantly very warm between plates of hot iron to preserve their softness. Every leaf must be loaded with a weight heavy enough to prevent its warping. To join the edges of these pieces of horn together, it is necessary to provide strong iron moulds suited to the shape of the article wanted, and to place the pieces in contact with copper-plates, or with polished metal surfaces against them; when this is done, the whole is to be put into a vice and screwed up tight, then plunged into boiling water, and after some time it is to be removed from thence and immersed in cold water, which will cause the edges of the horn to cement together, and become perfectly united.

To complete the polish of the horn, the surface must be rubbed with the subnitrate of bismuth by the palm of the hand. The process is short, and has this advantage—that it makes the horn dry promptly.

When it is wished to spot the horn in imitation of tortoise-shell, metallic solution must be employed as follows.—To spot it red, a solution of gold in aqua riga must be employed; to spot it black, a solution of silver

in nitric acid must be used; and for brown, a hot solution of mercury in nitric acid. The right side of the horn must be impregnated with these solutions, and they will assume the colours intended. The brown spots can be produced on the horn by means of a paste made of red lead, with a solution of potash, which must be put in pieces on the horn, and subjected some time to the action of heat. The deepness of the brown shades depends upon the quantity of potash used in the paste, and the length of time the mixture lays on the horn. A decoction of Brazil wood, a solution of indigo, with sulphuric acid, a decoction of saffron, and Barbary tree wood is sometimes used. After having employed these materials, the horn may be left for half a day in a strong solution of vinegar and alum.

In France, Holland, and Austria, the comb-makers and horn turners use the clippings of horn, which are of a whitish yellow, and tortoise shell skins, out of which they make snuff boxes, powder horns, and many curious and handsome things. They first soften the horn and shell in boiling water, so as to be able to submit them to the press in iron moulds, and by the means of heat form it into one mass. The degree of heat necessary to join the horn clippings must be stronger than that for shell skins, (and which can only be attained by experience). The heat must not be too great, for fear of scorching the horn or shell. Considerable care is required in these operations, not to touch the horn with the fingers, nor with any greasy body, because the grease will prevent its joining perfect. Wooden instruments should be used to move them, while they are at the fire, and for carrying them to the moulds.

French Patents

Granted in January, February, and March, 1825.

Machinery to manufacture endless Paper. Bruand, Porlier and Deuieux, at Besancon, for fifteen years.

Andrieux, at Paris, to substitute by Carding Engines, the Bow-string, "Archet or Arcon," in the Manufacturing of Hats, and thereby to employ the waste of Cachemere wool, for five years.

Process of Manufacturing Whale Oil. Lervux-Lajonkaire, at Paris, for ten years.

New Hydraulic Power. Bodmer, Director of the Salt Works, Duchy of Baden, for fifteen years.

Distilling Apparatus. Lustrae, at Naneit, department of Gers, for ten years.

A Duoration, imitating gold, silver, and mother of pearl. Fougères and Herars de Villiers, at Paris, for five years.

A Process to employ the Acids of Grease, Tallow, Butter, and Oils saponified, in Gas Lighting, Gayhusac and Chevruel of Paris, fifteen years.

For employing in Embroideries, the transparent parts of Feathers, Whalebone, Shell-fish. Doderet, at Paris, for five years.

Improvements on Guns, system of Pauty. Pichereaux, at Paris, for ten years.

Improvements in Manufacturing Factice Marble. Garneir and Co. at Paris, for fifteen years.

A Process to Manufacture Gas from Coal, and to purify it by a Mixture of Atmospheric Air. Hanchett, at Paris, for fifteen years.

A Process to extract the Argile for Manufacturing Pottery. Favreaux at Ivry, near Paris, for ten years.

A Process to cleanse Woollen Cloth. Martin, at Paris, for ten years.

An Apparatus to empty the dyeing Pans of the Liquor. Chappelain Sonat, at Rouen, for five years.

A Machine to Spool Silk. Lauret and Son, at Ganges, for five years.

Hernia Bandages. Wickham, at Paris, for five years.

Improvements in the Manufacturing of Iron. Ponsardin, at Rheims, for fifteen years.

A Machine, called "Fly-frame," in Cotton Spinning. Risler and Dixon, at Cernay, Upper Rhine, for five years.

Improvements in Bandages of Mr. Salmon's Invention. Martin, at Marseilles, for ten years.

Improvements in the Weaving Machine, called "Jacquart." George, at Lyons, for five years.

A Machine called "Ecarasse," to open the Wool coming from the Dyeing. Mentigny, at Vienne, department of Ysère, for five years.

Iron Rail Roads. J. Cordier, at Paris, for fifteen years.

For employing several Acids in the Manufacture of Wax Candles, which he calls "Oxigenated." Cambacerès, at Paris, for fifteen years.

Improved Apparatus to apply to Steam Boats. Granier, at Trefort, department of Ain, for ten years.

Improvements in Propelling Boats, in River Navigation. Oudier and Delivani, at Chalon-sur-Saone, for five years.

Improvements in the Manufacturing Vegeto-mineral Tar. Meyrac, at Dax, department of des Landes, for five years.

A Process to Manufacture Hats with the Feathers of Poultry. Masnyac à la Razade, department of Creuse, for five years.

Distilling Apparatus. Serton, at Mailé, department of Charente inférièure, for fifteen years.

A Water, called "Gold Water," for cleaning Teeth. Lebon, at Paris, for five years.

A rotary Muconisme, applicable to Horse-wheels, Steam Engines, &c. Gabiroux, at Paris, for five years.

An Apparatus to carbonise Turf, Coal, Wood, &c. Ramoes and Co. at Chalons-sur-Saone, for fifteen years.

A Mechanism to Manufacture Bottle Corks. Tschageny, at Paris, for fifteen years.

A Mechanical Apparatus to place the Pendulum of Clocks in equilibrium. Petit-Pierre, at Paris, for five years.

Articulated Cork Clogs. Vaillant, at Paris, for five years.

Composition of a Roman Cement, to Manufacture Statues, Bas-reliefs, and Architectural Ornaments. Dutilliet, at Paris, for fifteen years.

New Gas Valves and Bees. Hanchett and Smith, for fifteen years.

Improvements on a Weighing Machine, called "Balance a Casuele." Rollé, at Strasbourgh, for ten years.

Improvements of elastic Pattens. Billiette, at Paris, for five years.

For Additions to his Patent of "Oxigenated" Wax Candles. Cambacerès, at Paris, for fifteen years.

A Mechanism to triturate Oil Seeds. Lecomte-Grioteray, at Lyons, for ten years.

Improvements in Apparatus to transport portable Gas. Jalabert, at Paris, for fifteen years.

A Mechanism to Manufacture a Silk Stuff like Lace. Poulet, at Lyons, for fifteen years.

Improvement in Fire-arms charged with Fulminating Gunpowder. Gosset, at Paris, for ten years.

Improved Window Sashes. Saintament, at Thuite Signol, department of Eure, for five years.

Additional Improvements to the Process of cleaning Woollen Cloth. Beauvisage, at Paris, for ten years.

Additional Improvements to his Invention of a Mechanism, he calls "Mechanical Soul," to produce a rotative Motion by Steam, Water, &c. Giudicelli, at Paris, for fifteen years.

Improvements on the Weaving Machine for Tulli, Lace, &c. Calas and Delompnes, at Lyons, for five years.

A mechanical Apparatus to plane and join Planks, for flooring, &c. De Manneville, at Paris, for fifteen years.

Picking Machine. Westermaun Brothers, at Paris, for five years.

Mechanism to Manufacture Nails. Irroy, at Paris, for fifteen years.

Lantern, called "Micropharo" Poupard, at Paris, for five years.

An Apparatus to reel Silk, &c. Badnall and Gibbon Spilsburg, (England), at Paris, for fifteen years.

Process of Spooling Silk-thread. Poidebard, at Lyons, for ten years.

Improvements in Manufacturing Horse Shoes. Ellwand, of London, for fifteen years.

Improvements on his Invented Gun, by Percussion. Guillemin Lambert, at Autun, department of Saone and Loire, for five years.

Improved Machine to wind Weft, called "Trameuse." Gerard, at Lodevè, department of Herault, for ten years.

Process to employ the waste of Plaster. Accary Baron, at Paris, for ten years.

For Clarifying Liquors. Taylor, of London, for ten years.

Apparatus to be applied to Steam-boats, to prevent the re-action of the Water against the Wheel. Bourdiel Desarnod, at Toulouse, for fifteen years.

Machine called "Georama," to facilitate the Study of Geography. Delanglard, at Paris, for ten years.

Improvements on the Guns invented by "Pauly." Plombduer, at Paris, for five years.

Composition (Metallic) to substitute Tin Pottery. Deriard, at Lyons, for ten years.

A Machinery to Propel Carriages without Steam, &c. Felir, at Vic-Dessos, department of Arriegà, for ten years.

Improvements on a Patent for Spooling and Spinning Silk. Lauret and Son, at Ganges.

A Pomatum to preserve and reproduce the Hair. Dissey, Piver and Co. at Paris, for five years.

For additional Improvements to his Invention of preparing a Substance to clarify Syraps, and Manufacture Printing Ink or Colours. Berghouniaux, at Clermont, ferrante, for fifteen years.

Additional Improvements in preserving Alkaline Fats of Dyers, &c. Capplet, at Elbeuf, for fifteen years.

Improvements in Manufacturing of Salt. Howe, of London, for fifteen years.

Mechanical Theatre. Jeanne, at Dijon, for five years.

Additional Improvements in Weaving Machinery. Debergue, at Paris, for fifteen years.

Steam Engine of high and low Pressure, without Boiler, on Hawkin's System, of Philadelphia. Aynard, brothers, at Lyons, for fifteen years.

Improvements on Fire-arms, called "Pauy." Picherau, at Paris, for ten years.

Pyrotechnical Apparatus in Gas, for lighting and heating of Rooms. Bouvert and Co. at Paris, for ten years.

An Imitation of Diamonds, by a Vitrified Composition. Rischop, at Paris, for five years.

Improvements on a Steam Engine of high and low Pressure, without Boiler, on Hawkin's System of Philadelphia. Aynard, frerês, at Lyons, for fifteen years.

Improvements in making Charcoal without Waste. Mollerat, at Paris, for fifteen years.

Rotatory double acting Pump. Lavigne, at Nantes, for five years.

GRANTED IN APRIL, MAY, AND JUNE, 1825.

"Canadienne," a Liquor from the Pine Tree. J. Taylor, Paris, department of the Seine. Sealed 8 April, for ten years.

Washing Apparatus. Junius Smith and John Tyrell, Paris, department of the Seine, 8 April, for ten years.

Brushing Machine. J. John Jones, Paris, department of the Seine, 8 April, for ten years.

Process to Figure Skins. Aylaé-Reine Susse, Paris, department of the Seine, 8 April, for ten years.

Process of adapting one or more Cylinders to Atmospheric Steam Engines. William Hamy, Boulogne-Sur-Mer, 14 April, for fifteen years.

Machinery to Spin Hemp and Flax. Vantroyon and Co. Paris, department of the Seine, 14 April, for ten years.

Distilling Apparatus for Wine. P. Monnet, fils. et Grand—Gallurgeus, department du Gard, 14 April, for ten years.

Artificial Nipple to Feed Children without a Nurse. A Chapelle, at Alais, department du Gard, 14 April, for five years.

Apparatus to Feed Boilers in Sulphur Refineries. J. F. Feissac, at Marseille, department Boucher du Rhône, 14 April, for ten years.

Improvement in Hydrostatic Lamps. C. B. Astier, Toulouse, department of Haute Garonne, 14 April, for five years.

Machinery to Pick, Card, and Stubber Wool and Cotton. E. M. L. Ternaux, Son, Paris, department of the Seine, 21 April, for fifteen years.

Mechanical Lamp. F. N. Nicod, Paris, department of the Seine, 21 April, for five years.

Process for Propelling Steam Vessels. De Miremont, Esq. at Vienne, department of Isère, 21 April, for fifteen years.

Machinery to Dress the Surface of Flooring Brick Tiles. L. H. Boquet, at Sevres, department of the Seine and Oise, 28 April, for five years.

Application of Bas-Reliefs and Figures on Toilet Soaps. L. P. Soyez, Paris, department of the Seine, 28 April, for five years.

Iron Rail Roads and Carriages. J. Sargent, Paris, department of the Seine, 28 April, for ten years.

Machinery to Spin Combed Wool. J. M. Daullè, Paris, department of the Seine, 28 April, for fifteen years.

Windmill with Horizontal Wings. P. F. Sauvage, at Boulogne-Sur-Mer, 28 April, for five years.

Process to Manufacture Colours. A. Jozin, at Gisors, department of the Seine and Oise, 28 April, for ten years.

Machinery to Plane and Join Wood, Flooring, &c. D'Manneville, at Gonneville, department of Calvados, 28 April, for fifteen years.

Double Spying-glass. J. P. Lemaire, Paris, department of the Seine, 28 April, for five years.

Process to Manufacture Candles by Machinery. J. C. Garin, at Valence, department of Drôme, 28 April, for five years.

A Vertical and Horizontal Saw. P. Million, at Loriol, department of Drôme, 28 April, for five years.

Galvanic Tooth Powder. A. Fossembar, at Bordeaux, department of Gironde, 28 April, for five years.

Process and Machinery for Drawing the Silk from Cocons. L. M. Chambon, at Alais, department of Gard, 28 April, for ten years.

Improvements in Manufacturing Salt. A. E. Jauge, Paris, department of the Seine, 19 May, for fifteen years.

Mechanical and Moveable Baths. L. J. Touchard, at Paris, department of the Seine, 19 May, for fifteen years.

Articulated Steam Boats. T. Margoridon, and A. F. Frossard, at Paris, department of the Seine, 19 May, for fifteen years.

Rye Coffee. C. J. Kint, at Paris, department of the Seine, 19 May, for five years.

"Panales" Sugar Cake. A Mata, Paris, department of the Seine, 19 May, for five years.

House Coverings in Paper. William Forbes, Paris, department of the Seine, 19 May, for ten years.

Bricks for Chimneys, &c. Gourlier, Paris, department of the Seine, 19 May, for five years.

Machine to Twist and Clean Silk Thread. J. L. Peyeau, at Montelimart, department of Drôme, 19 May, ten years.

Improved Auger. William E. Lee, Paris, department of the Seine, 19 May, for ten years.

Steam Carriages. W. H. James, Paris, department of the Seine, 19 May, for five years.

A System of regular High Roads, for ordinary Carriages and Steam Carriages. P. A. Chaper, Paris, department of the Seine, 19 May, for fifteen years.

"Fluid Machine," to operate a Rotative Motion by the immediate application of Steam, Water, Wind, or Gas. J. M. Gindicelli, Paris, department of the Seine, 19 May, for fifteen years.

Machinery to Manufacture Wire Nails or Spricks. Bruiz et Co. Lyons, department of the Rhône, 19 May, for ten years.

Machinery to Direct the Carriage of a Spinning Wheel or Mule. J. Collier, Paris, department of the Seine, 19 May, for ten years.

"Prolixar," a Machine to substitute Presses. A. Canning, Havre, department of the Seine, inferieure, 19 May, for five years.

Instantaneous Light Machine and Caoutchouc Corks. H. Berry, Paris, department of the Seine, 19 May, for ten years.

Unsmelling Water Closets and Close Stools. R. Cantwell, Paris, department of the Seine, 19 May, for ten years.

Propelling Boats or Ships. R. Ort, Paris, department of the Seine, 19 May, for ten years.

Machinery to Manufacture Net Purses. P. F. Simonel, Paris, department of the Seine, 19 May, for ten years.

Means to fix an Achromatic Glass. T. C. Bautain, Paris, department of the Seine, 19 May, for five years.

Improvements in the Machinery and Process of Manufacturing of Salt. R. Howe, Paris, 19 May, for fifteen years.

Improvements in Steam Engines. J. Raymond, 19 May, for fifteen years.

Means to figure Bobbin-net Lace. J. Heathcoat, Paris, department of the Seine, 25 May, for fifteen years.

Improvements in Machinery to Draw Silk from the Cocons. J. Heathcoat, at Tiverton, Paris, department of the Seine, 25 May, for fifteen years.

Process of Manufacturing Vermillion in a Wet State. P. J. Desmoulins, Paris, department of the Seine, 25 May, for ten years.

"Argentan," a Compound Metal. Delaval, freres, et Co. Paris, department of the Seine, 25 May, for ten years.

Oxigenated Wax Candles. J. L. L. Cambaceres, Paris, department of the Seine, 25 May, for fifteen years.

Impervious Shoes, Boots, &c. A. Sakoski, Paris, department of the Seine, 25 May, for ten years.

Propelling Vessels against the Current of Water. L. Richard, Paris, department of the Seine, 25 May, for fifteen years.

Process to convert Tallow into a material which has the property of Wax. F C. S. Hebert, Paris, department of the Seine, 25 May, for fifteen years.

Propelling Vessels up the River. B J. Dubost, fils, Lyons, department of the Rhône, 25 May, for fifteen years.

Improvements in Looms and Dressing Machines. T. Walrich, Stanfeld, Leeds—Paris, department of the Seine, 2 June, for fifteen years.

Liquid to prepare Olives, "Lapicholine." H. Reynaud, at Nismes, department of Gard, 2 June, for five years.

Ventilator. P. Gay, at Lyons, department of the Rhône, 2 June, for five years.

Mechanical Spooling of Cotton Twist. A Wetzel, at Thonn, department of Upper Rhine, 2 June, for ten years.

Apparatus to carry Portable Gas. J. B. Jalabut, department of the Seine, 2 June, for fifteen years.

Elliptic Piano Forte. E. Eulriot. Paris, department of the Seine, 2 June, for ten years.

An indigenous Substance or substitute for Gallnuts. L. Francois, Dorreilly Pellusin, department of Loire, 9 June, for fifteen years.

Process to Draw and Wind Silk. S. Poidebard, at Lyons, department of Rhône, 9 June, for ten years.

Process to Singe Stuffs with Gas, &c. C. J. Andrieux, Paris, department of the Seine, 17 June, for ten years.

Machinery to Spin Flax and Hemp. A. Lamb, London—Paris, department of the Seine, 17 June, for fifteen years.

Patton's "Universal." F. M. Mignard, Billinge, Paris, department of the Seine, 23 June, for five years.

New Rotatory Engine. O. Picquiere, department of the Seine, 23 June, for fifteen years.

Mechanism adapted to Wind Instruments. J. J. X. Delavenna, Lille, department Nord, 23 June, for five years.

Process of Manufacturing Coke, and Heating Steam Engine Boilers. S. Irroy, Paris, department of the Seine, 23 June, for fifteen years.

Power Loom for Woollen Cloth. J. Collier, Paris, department of the Seine, 30 June, for fifteen years.

Alabaster "French." T. Leroy, Paris, department of the Seine, 30 June, for five years.

Machine to Weave four Pieces at once by one Workman. S. Silvan, at Vaucluse, department of Vaucluse, 30 June, for five years.

Machine to Spin Silk. A. Laporte and F. Jean, department of Gard, 30 June, for ten years.

Engraving Machine. A. Collar, Paris, department of the Seine, 30 June, for five year.

Application of the Diving Bell to the Coral Fishery. Hamlet & Co. Paris department of the Seine, 30 June, for fifteen years.

New Patents Sealed, 1825.

To George Henry Lyne, of John-street, Blackfriars-Road, machinist and engineer, and Thomas Stainford, of the Grove, Great Guildford-street, Southwark, smith and engineer, for their invention of certain improvements in machinery for making bricks—Sealed 23rd August—6 months.

William Parr, of Union-place, City-road, in the county of Middlesex, gentleman, for his invention of an improvement or improvements in the mode of propelling vessels —27th August—6 months.

To John Bowler, of Nelson-square, Blackfriars-road, in the county of Surrey; and Thomas Galon, of the Strand, in the county of Middlesex, hat-manufacturers, for their invention of certain improvements in the manufacture of hats—27th August—6 months.

To Charles Mercy, of Edward-buildings, Stoke Newington, in the county of Middlesex, gentleman, for his invention of certain improvements in propelling vessels —8th September—2 months.

To William Jefferies, of 46, London-street, Radcliffe-cross, in the parish of Radcliffe, in the county of Middlesex, brass manufacturer, for his invention of a ma-

chine for impelling power without the aid of fire, water, or air—15th September—6 months.

To Jean Antoine Teissier, of Tottenham Court-road, in the county of Middlesex, gentleman, in consequence of a communication made to him by a certain foreigner residing abroad, for certain improvements in steam-engines—15th September—6 months.

To Cathcart Dempster, of Lawrence Pountney-hill, Cannon-street, in the city of London, gentleman, for his invention of patent cordage—15th September—6 months.

To George Holworthy Palmer, of the Royal Mint, civil engineer, for his new invented machinery for propelling vessels through the water, to be effected by steam or any other power—15th September—6 months.

To Adam Eve, of South, in the county of Lincoln, carpet manufacturer, in consequence of a communication made to him by William Augustus Prince, a foreigner residing abroad, for certain improvements in manufacturing carpets, which he intends to denominate Prince's Patent Union Carpet—15th September—6 months.

To Isaiah Lukens, late of Philadelphia, but now of Adam-street, Adelphi, in the county of Middlesex, machinist, for his new invented surgical instrument, for destroying the stone in the bladder without cutting, which he denominates Lithontriptor—15th September—6 months.

To Sir Thomas Cochrane, knight, (commonly called Lord Cochrane,) of Tunbridge Wells, in the county of Kent, for his invention of a new method of propelling ships, vessels, and boats at sea—15th September—6 months.

To Charles Jacomb, of Basinghall-street, in the City of London, wool-broker, for his invention of certain improvements in the construction of furnace stoves, grates, or fire-places—15th September—6 months.

D.	H.	M.	S.	
1	12	0	0	☾ in conj. with A in Taurus.
1	21	0	0	☾ in conj. with 2 η in Tau.
2	16	14	23	♃'s 1st Sat. will immerge.
3	5	0	0	☾ in conj. with ♄ long. 21° in Gemini ☾ lat. 37′ S. ♄ lat. 1° 32′ S. diff. lat. 55′.
3	14	0	0	♀ in conj. with ζ in Leo.
3	22	0	0	☾ in conj. with η in Gem.
4	0	0	0	♄ Stationary.
4	2	0	0	☾ in conj. with μ in Gemini.
4	9	0	0	♀ in conj. with ♃ long. 4° in Virgo ♀ lat. 50′ N. ♃'s lat. 52′ N. diff. lat. 2′
4	16	0	0	☿ in conj. with β in Virgo.
4	18	12	0	☾ in □ last quarter.
4	20	0	0	☾ in conj with ζ in Gem.
6	22	0	0	☾ in conj. with 1 α in Canc.
6	23	0	0	☾ in conj. with 2α in Cancer.
7	18	0	0	☾ in conj. with o in Leo.
8	2	0	0	☾ in conj. with π in Leo.
10	20	0	0	☿ in conj. with ν in Virgo.
11	11	30	0	Ecliptic Conjunction or ● New Moon.
12	10	0	0	♂ in conj. with ♃ long. 6° in Virgo ♂ lat. 1° 22′ N. ♃'s lat. 0° 54′ N. diff. lat. 28′.
13	15	0	0	☿ in conj. with χ in Virgo.
14	3	0	0	♀ in conj with σ in Leo.
14	6	0	0	☽ in conj with δ in Scorpio.
16	11	0	0	☽ in conj. with 1 μ in Sag.
16	11	0	0	☽ in conj. with 2 μ in Sag.
17	10	0	0	☽ in conj. with π in Sagit.
17	14	0	0	☽ in conj. with δ in Sag.
18	7	6	0	☽ in □ first quarter.
18	19	0	0	☽ in conj. with β in Cap.
20	17	0	0	♀ in conj. with β in Virgo.
23	4	51	0	☉ enters Scorpio.
25	16	24	8	♃'s 1st Sat. will emerge.
26	10	2	0	Ecliptic opposition, or ○ full moon.
27	4	0	0	♀ in conj. with ν in Virgo.
27	17	0	0	☾ in conj. with δ in Aries.
28	18	0	0	☾ in conj. with A in Tau.
29	3	0	0	☾ in conj. with 2κ in Tau.
29	11	0	0	♂ in conj. with σ in Leo.
29	20	0	0	☾ in conj. with ι in Taurus.
30	8	10	30	An Occultation of Saturn and the Moon, Saturn will re-appear on the dark limb of the moon at 9h. 5m. 9sec.
31	4	0	0	☾ in conj. with η in Gem.
31	8	0	0	☾ in conj. with μ in Gem.
31	11	0	0	☾ in conj with ν in Gem.
31	23	0	0	♀ in conj. with γ in Virgo.

The waxing ☽ moon—the waning moon ☾

Rotherhithe. J. LEWTHWAITE.

METEOROLOGICAL JOURNAL, AUGUST AND SEPTEMBER, 1825.

1825.	Thermo.		Barometer.		Rain in inches.	1825.	Thermo.		Barometer.		Rain in inches.
	Higt.	Low.	+	—			Higt.	Low.	+	—	
AUG.						SEPT.					
26	70	48	30,09	30,10	,725	5	60	42,5	29,99	Station	
27	60	49	30,05	29,98		6	65	39	29,95	29,88	
28	65	54	29,94	29,98		7	66	42	29,74	29,66	
29	66	55	30,00	Station		8	69	51	29,59	29,60	,625
30	78	58	30,00	30,04		9	67	41	29,66	29,70	
31	75	56	30,05	Station		10	68	51	29,70	29,50	
SEPT.						11	66	55	29,50	29,55	
1	67	[illegible]	30,04	Station		12	69	51	29,67	29,75	
2	72	54	30,05	30,09		13	65	54	29,85	Station	
3	70	51	30,13	30,06		14	70	50	29,49	29,40	
4	63	49	29,99	30,00							

CHARLES H. ADAMS, LOWER EDMONTON.

LITERARY AND SCIENTIFIC NOTICES.

The Burmese Imperial State Carriage, which was captured at an early period of the present sanguinary Indian war, has just reached this country, and is now preparing for a public exhibition. It is said to be one of the most splendid works of art that can possibly be conceived, presenting an entire blaze of gold, silver, and precious stones; of the latter, the number must amount to many thousands, comprehending diamonds, rubies, sapphires, white and blue, emeralds, amethysts, garnets, topaz, cats eyes, crystals, &c. &c. The carving is of a very superior description; the form and construction of the vehicle extraordinary; and the general taste displayed throughout the whole design, is at once so grand and imposing, yet at the same time so chaste and refined, as to defy all rivalry even from European workmanship. The warlike power and resources of this surprising people, are at present exciting universal astonishment and attention; this new object attests the fact, that in taste, for design and skill in the execution of works of art, their talents have been no less hidden and unknown to us. The carriage stands between twenty and thirty feet in height, and is intended to be drawn by elephants.

Mr. E. T. Artis, the author of Roman Antiquities, to whose perseverance the public are indebted for the discovery of the Roman station at Castor, in Northamptonshire, has nearly ready for publication, in one volume, quarto, his Antediluvian Phytology, illustrated by a collection of the fossil remains of plants, peculiar to the coal formations of Great Britain.

The keeper of the Prince of Esterhazy's gallery of pictures, at Vienna, M. Antoine Rothmüller, has invented a new method of colouring in oil engravings and lithographic prints, to which he has given the name of Elœochalcography. The result of his invention, is to give to prints the appearance of having been executed by a painter with the greatest care. The Emperor of Austria has expressed his satisfaction at this invention; and has granted M. Rothmüller a patent for twenty years.

African Expedition.—Captain Clapperton has sailed in the Brazen, Captain Willes. His companions are Captain Robert Pearce, and Messrs. Morrison and Wilson, surgeons, R.N. The mission thus doubled, (for Captain Pearce and Mr. Morrison, take a different course from that of the other two,) will it is hoped, throw much light on the interior geography of Africa. The travellers are to land at Benin, and one party, Captain Pearce and his associate, will endeavour to penetrate to Timbuctoo, by an eastern route; while Captain Clapperton and his friend, seek to reach Soudon, by the north. The king of Soudon, it is understood, favours the effort, and has promised to have a guide at Sockatoo, and to use his influence with his brother monarchs to procure their countenance. We wish most earnestly that success may attend our intrepid countrymen, and restore them to us, and full of new discoveries.

Sketches of the twenty-four Classes of the Linnæan System, with fifty specimens of English plants, taken from nature, their place of growth, time of flowering, and medicinal properties, is in the press, and may be shortly expected.

Mr. Bentley, a member of the Asiatic Society, has in the press, we understand, "An Historical View of the Hindu Astronomy," from the earliest dawn of that science in India, to the present time.

LONDON:
SHACKELL AND ARROWSMITH, JOHNSON'S-COURT, FLEET-STREET.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. LX.

Recent Patents.

To WILLIAM DARKER MOSLEY, *of the Parish of Radford, in the County of Nottingham, Lace Manufacturer, for his Invention of certain Improvements in the Making and Working of Machines used in the Manufacture of Lace, commonly called Bobbin Net.*

[Sealed, 10th March, 1824.]

THESE improvements in machines employed for the manufacture of bobbin net lace, do not apply to the mechanism of the parts by which the threads are twisted to form the meshes of the net, but consist in the adaptation of certain shafts and wheels, for the purpose of enabling the machinery already known, to be worked by a rotatory power, instead of being actuated by the hands and feet of the workman as heretofore. The contrivance exhibited in the specification is adapted to a lace machine,

constructed upon what is called the *Levers' principle*, but the same or a similar contrivance is also capable of being applied to lace machines of several other kinds.

The patentee states that instead of actuating the machines by means of levers moved by the hands and feet of the operator in front as usual, he employs a winch attached to a shaft, from whence, by means of pinions and toothed wheels, rotatory motion is given to other shafts and cranks to be explained hereafter; or he attaches a rigger to an axle connected to the machinery, over which a band is passed leading from the rotatory shaft of a steam engine water wheel, or any other first mover.

Plate XI., fig. 1, exhibits an end view of a *Levers'* machine, with the improvements attached; fig. 2 is a section of the same, supposed to be cut through the middle of the machine in a perpendicular direction. The ordinary mode of actuating these machines is by raising the handles (shewn by dots) four times, which gives to the machinery four strokes, and produces such internal movements as effects the twisting of the threads round the series of points, or pins, set in one of the bars, and then the fifth stroke is given by the action of the foot of the workman upon a treadle below, which moves other parts of the machinery, and causes the other point bar to be depressed, which, in rising again, takes up and holds the twist that has been made, and thus forms one side of the mesh; a repetition of which five actions produce the accumulating meshes that constitute the net.

In the improved machine a horizontal shaft, *a*, is mounted in suitable bearings connected to the woodwork or framing, and at one end of this shaft is attached a winch or handle, *b*, the reversed end having a toothed pinion, *c*. This pinion takes into a toothed wheel, *d*, and the wheel, *d*, into another toothed wheel, *e*, of equal dia-

meter, which last mentioned wheel is affixed upon the main axle or shaft, *f*. At the end of this shaft, *f*, is also attached a large wheel, *g*, four-fifths of the periphery of which wheel has teeth set round it, and the other fifth of its periphery is left blank. This wheel is intended to take into a pinion, *h*, on a crank shaft, *i*, which pinion is exactly one-fifth of the diameter of the wheel, *g*, and, consequently, the crank shaft is made to turn round four times, and to stand still one interval while the wheel, *h*, is making an entire revolution.

To the crank shaft are also attached jointed connecting rods, *k*, which are fixed at their reverse ends to that well known part of the *Levers'* lace machine called the goose-necked lever, and by means of the revolution of this shaft, actuated by the handle, *b*, and its train of wheels, the internal operative parts of the machine are set to work.

The handle, *b*, being uniformly turned by the workman, or the shaft, *a*, being actuated by steam, or other power, gives rotatory motion to the wheel, *g*, as before said, and the teeth round four-fifths of the periphery of this wheel taking into the pinion, *h*, causes that pinion, and the crank shaft, *i*, to revolve four times during the revolution of the toothed part of the wheel, *g*, and hence by the connecting rods, *k*, four strokes are given to the goose-necked lever, for the purpose of moving the operative parts of the mechanism, exactly as when the front lending bar is lifted four times by the handles in the ordinary mode of working the Levers' machines.

The crank shaft remains stationary, while the blank part of the wheel, *g*, is passing the pinion in order to bring down the point-bar, by a contrivance which will be presently described, and upon the end of the crank

shaft a disc is fixed, with a notch in its periphery, for a pall to drop into, in order to hold the shaft still during the descent of the point-bar. At the inner extremity of the main shaft, *f*, (about the middle of the machine), a pinion, *l*, is fixed, which revolves with the shaft, this pinion takes into a toothed wheel, *m*, of twice the diameter of the pinion, and the toothed wheel is thereby made to turn once round to two revolutions of the main shaft and pinion.

Upon this wheel, *m*, there are two tappets, *n*, *n*, so adjusted that one of them may strike one of the lifting rods, *o*, immediately as the crank shaft, *i*, and its connections become quiescent. These lifting rods, *o*, are suspended by pivots from the tail poles, *p*, *p*, and as they rise respectively lift the tail pole, and depress the point bar, which movements in the ordinary *Levers'* machine are effected by the treadles at bottom.

It will now be seen that when, by the revolution of the crank bar, as above described, the four strokes of the goose-necked lever has being produced, one of the tappets immediately raises one of the tail poles, which as it descends again brings up the point bar that secures the twist of the threads just formed. It is scarely necessary to say that every revolution of the main shaft, *f*, carries the machine through the several movements for the formation of one half of the mesh.

The patentee observes, having explained his mode of working a *Levers'* lace machine by a rotatory motion effected by hand, it may be necessary to say that the same operation may be produced by steam, or any other power, by attaching a rigger to the main shaft, *f*, when the shaft, *a*, its handle, *b*, the pinion, *c*, and the toothed wheels, *d* and *e*, are to be dispensed with. The other

parts of the movements will be the same, and the revolutions of the main shaft will produce the operation of the mechanism in the manner already described.

It is lastly stated, that though the improvement is only exhibited in the drawing as attached to a machine upon the *Levers'* principle, yet the patentee means to claim the same contrivance as capable of communicating motion to various other kinds of lace machines, by a rotatory power; and in adapting this improvement to such other machinery, the general construction of the parts which are claimed as new in their application to lace machines would not be altered, but merely such modes of attachment would be adopted as circumstances might render desirable, according to the peculiar construction and dimensions of the machines intended to be so worked.

[*Inrolled, September*, 1824.]

To Henry Marriott *of Fleet-street, in the City of London, Ironmonger, for his Invention of an Improvement on Water-closets.*

[Sealed 14th October, 1824.]

This improvement applies to a portable chamber-convenience, commonly called a close-stool, and consists in a mode of throwing clean water into the pan, for the purpose of cleansing it after use. Plate XI. fig. 4. exhibits the portable chamber-convenience in section, *a*, is the basin, and *b* is the dish at bottom of the basin, which closes the lower aperture. This dish acts as a lever turning upon a joint at *c*, and *d* is the tail of the lever,

against which a sliding rod, *e*, acts. When the rod, *e*, is pressed down, the dish is kept up close against the lower aperture of the basin forming its bottom, but when the rod is raised the dish falls, and deposits the soil in the vessel below.

Connected to the sliding rod, *e*, is the rod of a piston, *f*, which works a force-pump; *g* is a vessel containing clear water as a reservoir, and *h* is what is commonly called the suction pipe of the pump; *i*, being the pump-barrel.

When the close-stool has been used the rods, *e* and *f*, are to be raised, by which the piston is drawn up, and this producing a partial vacuum in the pump-barrel, *i*, causes the water to flow through the pipe, *h*, from the reservoir into the barrel, at the same time that the soil falls out of the basin, *a*, by the descent of the dish, *b*. On sliding the rods, *e* and *f*, down again into their places, the dish, *b*, becomes raised, which closes the aperture of the basin, at the same time the piston, *f*, in passing down the barrel drives the water with considerable force through the lateral pipe, *k*, from whence it escapes at *l*, into the basin.

There is a conical valve at bottom of the pump-barrel, for the purpose of preventing the water from returning into the reservoir, and also a similar valve in the pipe, *k*, to keep the air from passing as the piston rises to produce the vacuum in the pump-barrel. The basin is set in a frame, the edges of which drop into a water joint, in order to prevent the passage and escape of any effluvia from the vessel below, and the bottom part of the basin and the dish hold a quantity of water for the same purpose, when the chamber-convenience is not in use.

The principle feature of this patent is the adaptation of the force-pump to the close-stool, for the purpose of

cleansing the basin; the lateral pipe for conducting the water, and the slide rod for raising the lever or dish are also new in their adaptation to such an apparatus; the other parts of the contrivance are not claimed, having been known and used before.

[*Inrolled, December*, 1824.]

To PHILIP TAYLOR, *of the City Road, in the County of Middlesex, Engineer, for his Invention of certain Improvements in Apparatus for Producing Gas from various Substances.*

[Sealed 15th June, 1824.]

THE apparatus herein proposed is designed for the purpose of distilling carbonated hydrogen gas for illumination from various fluids, (oil or tar, we presume, is principally intended to be employed in this apparatus.) The kind of retort proposed to be employed by the patentee, is shewn in section in Plate XI. fig. 3. It is placed in an erect position within its furnace, but that position is not absolutely essential. The furnace is to be constructed as usual of fire-brick, and may contain several retorts; *a, a,* are the vertical walls of the furnace, *b, b,* the retort, which is proposed to be made of cast-iron, it is cylindrically formed, resting by means of its flanges upon ledges at top, and the fire acts upon every part of its external surface below the ledges. Within the retort a shell or vessel, *c, c,* made of thin wrought-iron is inserted, exactly fitting the interior of the retort; this vessel is to contain clay, cinders, or other such materials as a

fitter for the gas, and for the convenience of frequently and expeditiously shifting these materials, the shell or vessel is employed. In the middle of the retort a tube, *d, d*, is placed, having a considerable number of holes at bottom, and into this tube a portion of the bent pipe, *e, e*, is introduced, which passes through an aperture in the cap.

The retort being filled with broken bricks, clay, cinders, or other such substances, (the largest pieces being at bottom), the cap, *f*, is to be fastened on and properly luted at the joint. The material to be distilled is then to be introduced in a fluid state by the pipe, *e*, from whence it flows through the holes at bottom into the retort among the clay or cinders, which are in a state of red heat. Here the material becomes decomposed, and rising in the form of gas, through the filtering substances, becomes clarified, and passes off at the top of the retort through the pipe, *g*, to the gasometer or gas-holder.

If the gas produced in this manner, by passing through one retort, does not prove to be sufficiently pure, the patentee proposes to conduct it through two retorts of similar construction to that shewn, and both occupied with filtering materials. In this case, however, the pipe for introducing the fluid to be distilled may be inserted into the side of the first retort near its top, and the fluid descending through the red hot cinders, or other filtering materials, is intended to rise in the form of gas into the central tube, through the holes at bottom, and from thence pass by a bent pipe through the cap of the first retort into a second retort, where it is to be conducted through the filtering materials exactly as at fig. 3, and to pass off by a pipe at the top of the retort to the gasometer.

The patentee does not confine himself to the erect position of the retorts, as shewn in the figure, though he

considers that position as most desirable, neither does he limit himself to the employment of iron retorts, as retorts made of fire-clay or fire-stone would answer the purpose, but he does not consider them as so convenient or economical; and, lastly, he does not specifically claim any material which shall be exclusively used for the purpose of distilling gas, but claims the employment of these means and such apparatus for the distillation of gas from all fluid substances which are capable of producing it.

[*Inrolled, December,* 1824.]

To WILLIAM HARRINGTON, *of Crosshaven, in the County of Cork, Esq., for his Invention of an Improved Raft for transporting Timber.*

[Sealed 15th June, 1824.]

THE improvement claimed under this patent, is the construction of a raft for the transporting of timber, with a bottom and external appearance like a ship. In erecting it, the keel, stern-post, and lower parts of the ribs, are to be first formed and put together, in the same way as in commencing the erection of an ordinary ship; the bottom is then to be made up, by placing bulk timbers side by side, and cutting their ends to the desired external form of the vessel; these bulk timbers are then to be braced together by others placed athwart, and in this way the form of the hull of a vessel is to be formed, leaving as little vacant space as possible in the lower parts, except the recesses or steps for setting in the feet of the masts.

In the upper part of the hull hollow spaces are to be left to form cabins, for the protection of the men who are employed to navigate the raft, and the outside of the hull should be planked over to render it as smooth as possible. To such a raft, masts, yards, bowsprit, and rigging, may be adapted of the kind employed in rigging ships of the usual construction, and the raft will appear externally as an ordinary ship.

The most suitable arrangements of the pieces of bulk timber, to form the raft, will be subject to variation, according to their sizes, and the magnitude of the raft to be constructed; and the disposition of the rigging, as well as its arrangement, will also depend upon the sort of ship which the raft is intended to resemble. On these points nothing specific is stated in the specification, and the claim of invention consists merely in making up a raft to resemble a ship, by combining bulk timber or such timbers as are intended for the market.

[*Inrolled, December*, 1824.]

To JOHN LANE HIGGINS, *of Oxford-street, in the County of Middlesex, Esq., for his Invention of certain Improvements in the construction of the Masts, Yards, Sails, and Rigging of Ships, and smaller Vessels, and in the Tackle used for working and navigating the same.*

[Sealed 7th July, 1824.]

THE improvements proposed under this patent are designed to render the quantity of canvas employed in rigging ships and other vessels, more effective than in the or-

dinary kind of rigging, and also to enable the sails to be reefed and furled with greater ease, and less danger to the seamen. The nature of these improvements will be best understood by reference to the figures shewn in Plate XIII, fig. 7, represents the mast and yards of a vessel, in which the sail, *a*, is formed on one edge in an arc, extended on a gaft or yard, having a roller which traverses up and down a rope, by which it is reefed and furled. The patentee says, that the advantages of this kind of rigging are, "no weight is lost during the operation of reefing, as the sail continues to set fair; the weight of the reef is in the middle of the vessel, leaving the outer end of the boom with a clear leeth, and the reef can be taken in and set out much quicker and safer than by the present mode."

For this kind of rigging, double masts are proposed, such as are shewn at fig. 8, and the sail is to be hoisted between these, and may thereby be worked with greater facility. "One-third of the sail being on the weather side of the vessel, the stress of the boom on the mast and the rigging is very much relieved, and a vessel thus rigged may jib all standing with perfect safety."

It is proposed that vessels of a moderate size (we do not know what sized vessels are intended) should have its bowsprit "attached to the fore-end of the boom; by which means the jib will draw on the same plane as the main sail, and act with full power before the wind." This contrivance is shewn at *b*, by these means the weight of the bowsprit will always be on the weather-side of the vessel; or the bowsprit may be worked by a swivel on a short boom at the stem of the vessel, the after-end moving in a traverse on the deck by means of tackle, which will bring the jib to act in any direction required.

The method of doing this is exhibited in the horizontal view of a vessel shewn at fig. 9; and in which will also be seen a double boom.

Instead of the gaft top-sail at present employed, it is proposed to use one like *c*, fig. 7, which may be drawn up to its position, or let down by means of tackle, without sending a man aloft, as is now the practice when the gaft top-sail is to be reefed or furled.

The patentee proposes, that "for vessels with two masts, the fore and aft sheets are to be all one rope, the middle of the rope passing round a wheel in the middle of the vessel." In this way one or two men may easily work it.

There are several variations of these contrivances proposed, as the employment of the sail, *a*, alone, without the bowsprit; of combining the bowsprit with it as shewn; of combining the sail, *c*, with the other contrivances, or employing it by itself in different ways, and also in the modes of attaching the blocks and ropes to reef and furl; all of which are designed to simplify the present modes of rigging vessels of different sizes, to improve their sailing, and to diminish the labour and danger attendant upon the present modes of working the tackle.

[*Inrolled, December,* 1824.]

To George Samuel Harris, *of Caroline Place, Trevor Square, Knightsbridge, in the County of Middlesex, Gentleman, for his New Invented Machine, for the purpose of giving the most effectual and extensive publicity by day and by night, to all Proclamations, Notices, Legal Advertisements, and other purposes, to which the same may be applicable, destined for useful information, and which will henceforward, render unnecessary the defacement of walls and houses in the Metropolis and its vicinities, by bill sticking, placarding, and chalking, which latter practices have become a great and offensive public nuisance.*

[Sealed 21st October, 1824.]

This machine is a cylindrical or octagonal lantern, formed of upright ribs of wood, and cross pieces, which divide the lantern into open compartments. It is to be mounted upon a carriage, and made to turn round upon a central standard as an axis, and the open compartments are to be occupied by straining frames, covered with printed bills or placards, containing the advertisements to be published. The carriage is to be drawn slowly about the town and its vicinity, and the lantern to be turned round occasionally as it proceeds, that all persons passing may see the bills or placards and be enabled to read their contents. The advertisements are to be printed in a bold conspicuous manner, and the frames which contain them are to be capable of being readily shifted, and others fixed in the compartments of the lantern, by means of small buttons, catches, or slight fastenings.

The precise form of the lantern is not a matter of importance, and the compartments into which it is to be divided, must be suited to the desired size of the bills or other placards to be exhibited. It is proposed to cover the straining frames with slight wires as a net work, to support the paper bills which are to be pasted upon them, and then varnished or otherwise rendered transparent. The framing of the lantern may be of wood or any other light material, and the top is proposed to be made of sheet tin, or copper, in an ornamental form. In order to protect the placards from rain, the top part of the lantern is to be made hanging over, and a gutter is to be formed round it with a pipe down the side to carry off the water.

The bills and placards thus displayed, will be perfectly conspicuous in the day time, but at night or in foggy weather it is intended to illuminate them, by placing lights within, when the advertisements will be evidently seen, by means of the transparency of the paper, or other material on which they are printed.

This contrivance, the patentee considers, will decidedly obviate the necessity of posting bills and other placards, upon the walls of houses and other places, or of chalking upon the walls, which has of late become a very great nuisance, not only in the metropolis, but also in every town and village throughout the kingdom.

[*Inrolled, December,* 1824.]

To Pierre Alegre, *of Kerez de la Frontera, in the Kingdom of Spain, Engineer, now residing at Collet Place, Commercial Road, in the County of Middlesex, for his Invention of an Improved and more Economical Method of Generating Steam, applicable to Steam Engines, and other useful purposes.*

[Sealed 7th October, 1824.]

The object of the patentee appears to be, to avail himself of every particle of the heat emanating from the furnace of his boiler, and in every possible way to increase the temperature and power of his steam, by bringing it again and again in contact with the furnace and its flues; the drawing, however, by which he has illustrated his invention, is so exceedingly rude, that we are not certain of having perfectly understood his plan, at least as far as we do comprehend it, have not a very clear conception of its advantages or novelty.

Plate XII. fig. 1, is intended to shew what perhaps should be called a section of the boiler, furnace, flues and steam pipes; *a*, is the lower compartment of the boiler; *b*, the furnace; *c*, the flues, extending round the boiler and steam chambers; *d*, the upper compartment of the boiler; *e*, the chimney, into which the flues ultimately lead; *f f*, a reservoir of water for supplying the boiler, through which the chimney passes; *g*, a pump for supplying the reservoir with water; *h h*, the brickwork that encloses the boiler, furnace, and flues; *i*, a steam chamber, where the steam is to become what the patentee calls *concentrated*, and *k*, is the part where the motive force is to be given to the engine.

In commencing the operation, cold water is to be

pumped into the vessel, *f*, and from thence conveyed by a pipe, *l*, into the lower compartment of the boiler, *a*. The furnace being then lighted, the water is made to boil in *a*, and the ebullition of steam rising up the pipes, *m m*, enter the upper compartment of the boiler, *d*. Here the temperature of the steam becomes raised, and it passes up the pipe, *n*, which is covered by an inverted tube, and returning down this, enters another tube, *o*, that encloses them both. The heat of the smoke and other vapours that passes up the chimney, heats the water in the reservoir, *f*, and raises the temperature of the steam in the tube, *o*, still higher, which passing on through a continuation of that tube, cased with wood, to prevent the radiation of heat, ultimately discharges itself into the chamber, *i*, where the steam from the heat of the flues that surround it, becomes greatly increased in its force, or, as the patentee calls it, *concentrated*. From this chamber it is to be let off as occasion shall require to the vessel *k*, where the motive force for working the engine is to be applied, but whether or not this is to be the working cylinder, does not appear.

The steam generated having reduced the water in the boiler, *a*, to within about two inches of the bottom, the further action of this boiler is to be suspended, and hot water from the reservoir, *f*, is now to be passed through the pipe, *p*, into another boiler of the same construction erected near the former, where the action of its furnace is to raise the steam in the same way as before described, and when that boiler is nearly exhausted, the water from its upper reservoir, like that at *f*, is to be conducted into the lower compartment, *a*, of the first mentioned boiler, and the second boiler being now put out of action, the same operation is to go on in raising steam in the apparatus as already explained.

The apparatus is to be furnished with pipes and cocks as at *q*, for drawing off the water, and *r*, for conducting the condensed steam into the boiler; it is also to have pipes with safety valves, as at *s s*, and glass tubes with gauges to exhibit the heights of the water in the boiler and reservoir, and also man-holes or openings, *t t t*, for gaining access to the interior, for the purpose of cleaning the insides of the vessels, and removing any crust which might be formed by deposition of salt, when sea water is employed.

These are the general features of the specification, but what are the peculiar features of novelty claimed by the patentee, we cannot exactly point out.

[*Inrolled, December,* 1824.]

To HUMPHRY JEFFREYS, *of Park Street, in the City of Bristol, Merchant, for his New Invented Improved Flue, or Chimney for Furnaces, and other purposes.*

THE object of this invention is, to produce an artificial draft in the chimnies of furnaces, and other extensive fire-places, and to condense the smoke and other vapours that arise from the combustion of coal in such fire-places; and also to prevent their escape into the surrounding atmosphere, which, in manufacturing districts, has been found so extremely unpleasant, and injurious to the health of the inhabitants.

The patentee proposes to close the top of the ordinary chimney of the furnace or other fire-place, and by means of a lateral flue at the upper part of the said chimney, to conduct the smoke and other vapours into a supplement-

ary flue, or shaft parallel to the chimney, where the smoke and other vapours, meeting with a continual shower of cold water from the top, will descend and become condensed, and with the water will run off at the bottom of the shaft into a drain or other receptacle.

Plate XI, fig. 5, is a section of the improved chimney and its flues; *a* is the throat leading immediately from the fire-place; *b*, is the chimney up which the smoke and other vapours pass that are emitted from the fire. The top of this chimney is closed, and near it is the lateral flue, *c*, along which the smoke and vapour is naturally obliged to proceed. This flue terminating in the supplementary shaft, *d*, delivers the smoke and other vapours from the chimney into that shaft, where it descends. At the top of the supplementary shaft, *d*, is a cistern, *e*, nearly filled with water; the bottom of this cistern is perforated with small holes, and the water passing through, descends in the form of a continued shower down the shaft, where meeting with the smoke emitted from the fire, it immediately condenses that smoke, and whatever vapours may be mixed with it, and precipitates the whole to the bottom, causing a partial vacuum in the shaft, which produces the artificial draft of the flue, and carries off the soot and condensed vapour into a sewer or other drain below.

The water may be supplied to the cistern, *e*, by an engine, or by any means that shall be found convenient; and the supplementary shaft may be close to the ordinary chimney, and separated only by a wall, as may be found most convenient; the invention consisting in causing the smoke and other vapours to pass into the supplementary shaft, and there to discharge a shower of cold water upon the smoke, for the purpose of producing a perfect con-

densation of the vapours, and thereby preventing the escape of smoke or effluvia that shall be prejudicial or unpleasant.

[*Inrolled December*, 1824.]

To WILLIAM BUSK, *of Broad Street, in the City of London, Merchant, for his Invention of certain Improvements in the means or method of Propelling Ships, Boats, or other Floating Bodies.*

[Sealed 29th June, 1824.]

THIS invention is called, "a new application of double inclined planes, or wedges and cones; and also a fall of water upon, and a current of water over inclined planes, for the purpose of propelling ships, boats, or other floating bodies."

Plate XII, exhibits the several modes proposed by the patentee, of applying these inclined planes, or wedges and cones, for the purpose of obtaining an oblique resistance in the water, by which the floating vessel is to be impelled forward. Fig. 2, represents a vessel with the propelling apparatus seen on the side, a similar apparatus being placed on the other side of the vessel. This is called a vibrating wedge, and consists of a wedge-formed block, *a*, moving up and down upon an axle, between two boards, *b b*, which are fixed against the side of the vessel; *c*, is a rod connected to the end of the beam, *d*, of a steam engine, and as the beam vibrates, the rod moves up and down, and causes the wedge, *a*, to move also. By the raising of the upper inclined plane of the

wedge, the water is squeezed upwards against the upper board, *b*, and by the descent of the lower inclined plane of the wedge, it is squeezed downwards against the lower board, *b*, in which action, the water being driven back by an oblique force, is said to propel the vessel in the opposite direction.

This vibrating wedge or double inclined plane, may be made to act in a vertical position, by placing it at the stern of the vessel, as shewn in fig. 3. The vibrating action being produced by the power of a steam engine or any other first mover, the wedge, *a*, will squeeze the water alternately against the boards, *b b*, on the right and left, and produce the impelling power in the same way as above described.

Fig. 4, exhibits a wedge, *a*, fixed to an upright rod, *b*, to be placed on the side of a vessel; which rod being connected at top, to the end of the beam of a steam engine or any other alternating power, (in the same way as the rod *c*, in fig. 2,) will be made to ascend and descend in the water, and by its inclined planes pressing obliquely against the water, the vessel is to be propelled forward in the direction of the base of the wedge.

A modification of this contrivance is shewn at fig. 5, in which the wedge is made hollow, that is, two inclined planes, *a* and *b*, are formed with valves or flaps opening outwards. The wedge is made to vibrate upon pivots at *c*, and is moved up and down by the rod, *d*. As the wedge rises, the flaps or valves of the upper inclined plane, *a*, close, and form a resistance to the water, the valves of the lower inclined plane, *b*, opening and allowing the water to pass freely through. As the wedge descends, the flaps of the lower inclined plane, *b*, close, and form a resistance, while those of the upper inclined plane open and permit the water to pass.

A variation in the mode of employing these valves or flaps, is shewn at fig. 6, which is a modification of the first contrivance. In this figure, *a*, is a vibrating wedge moving up and down upon pivots between the boards, *b* and *c*, by means of its attachment to the rod, *d*, connected to the beam of an engine or other first mover, as above described. When the wedge rises, the flaps or valves in the upper board, *b*, close, and form the resistance, against which the water is squeezed to give the oblique impelling force, the valves or flaps of the lower board, *c*, opening at the same time, and allowing the water to flow in. The depression of the wedge causes the flaps of the lower board to close, so as to afford the resistance, and those in the upper board to open and admit the water. Thus by the vibration of the wedge, *a*, a repetition of oblique strokes is given to the water, and the vessel is to be thereby impelled in an opposite direction.

Fig. 7, shews the plan or horizontal view of a vessel, with rotatory cones placed on the sides; *a a*, are two cones affixed by their bases to the rim of a wheel *b*, the shaft or axle of which wheel is supported in bearings, extending from the side of the vessel; *c*, is a rigger upon the axle, over which a band passes from the rotatory part of the steam engine or other power within. The wheel *b*, being made to revolve, the cones, *a a*, are passed through the water; and it is intended that their inclined surfaces, pressing against the fluid obliquely, shall produce the impelling power that is to drive the vessel forward: a similar wheel with the cones being placed on the other side of the vessel also.

The patentee considers that an alternating action of the cones would answer the purpose nearly as well as the rotatory movement described; and in making this variation of his principle of the conical propeller, he proposes

to employ one cone on each side of the vessel, and to attach it by its base to an oscillating arm, or some such contrivance actuated by the engine or otherwise, which in passing to and fro through the water, would produce the same sort of oblique stroke as a fish's tail, he therefore calls this last contrivance an *ichthyodic oar*.

The last part of the invention is denominated a *hydropetic propellant*, and is shewn at fig. 8, in the same form as in the specification; but we do not, from the description, discover the patentee's intentions so clearly as we could wish to do. The figure represents a section of the hull of a vessel, with a water pipe extending along its bottom from stem to stern; *a*, is the point where the water is admitted; it passes through a valve, and rising, runs along the pipe, *b*, and through another valve to a force pump, *c*. The pump being put in action by manual labour or otherwise, the rising of the piston causes a volume of the water to flow into the pump barrel, and on the descent of the piston, the water being prevented by the foot valve from flowing back into the pipe, *b*, is forced up the perpendicular pipe, *d*, and made to run over through the spout at top into an inclined trough, *e*. At the bottom of this trough is a carved box, in which a portion of the lower part of a bucket water-wheel turns, and as the water fills the buckets in succession on that side, the wheel is made to revolve, and the water discharged flows away through the pipe, *f*.

It does not appear from the specification, that this water-wheel is intended to turn paddles, or any other propelling apparatus; we are therefore at a loss to know in what way this *hydropetic propellant* is intended to effect the power required.

[*Inrolled December*, 1824.]

To Henry Maudsley *and* Joshua Field, *both of Lambeth, in the County of Surrey, Engineers, for their Invention of a Method and Apparatus for continually changing the Water used in Boilers for Generating Steam, particularly applicable to the Boilers of Steam Vessels making long Voyages, by preventing the deposition of Salt or other Substances contained in the Water, at the same time retaining the heat, saving fuel, and rendering the Boilers more lasting.*

Sealed 14th October, 1824.

This invention is, in the first instance, a method, by the assistance of an apparatus, of constantly and uniformly changing the water used in the boilers of steam engines, and which is particularly adapted for the boilers of steam vessels, where salt water is used for the production of steam, as in the ordinary mode, the deposition of salt and other earthy matters, on the bottom and sides of the boilers, render them extremely liable to injury from the action of the fire. The second part of the invention is a mode of arresting the heat contained in the boiling water withdrawn from the boiler, and of conveying it into the water, about to be introduced.

When sea water is employed in the boilers of steam engines, the evaporation quickly produces a supersaturation of salt in the remaining water, and this rapidly increasing, causes a concentration of the salt, and a deposition of earthy matters on the internal surface of the boiler, which renders it necessary to change the water al-

most every 50 or 60 hours. It appears from the experiments of the patentees, that "from twenty to thirty per cent of the quantity evaporated, taken out, will keep the water within a degree of saltness from which no practical evils can result, however long the boiling be continued." The proposition, therefore, is to effect a continued changing and refreshing of the water in the boiler, by constantly drawing out a quantity of the supersaturated water or brine, and introducing other water to supply the place of that so withdrawn, as well as that which had been evaporated, by which means the water in the boiler can never exceed a certain degree of saturation, proportionate to the quantity so withdrawn.

The method proposed to effect this object is, by the employment of meters, of any kind, that will regulate and adjust the quantity withdrawn to the quantity evaporated or driven off in the form of steam. No drawings are exhibited in the specification, it being considered that a general description of the method and kind of apparatus to be employed, will be sufficient to enable any person to construct the necessary machinery. The meter recommended to be used is "a small pump with a loaded discharge valve, worked by the engine, and so proportioned as to draw from the lowest part of the boiler the quantity determined upon."

"If, for instance, twenty-five per cent, or one quarter of the total evaporation, be the quantity withdrawn, it will be equal to one-fifth the quantity of common salt water driven into the boiler to keep up the supply. Thus as sea water contains about 0·32 parts of salt, the water of the boiler will slowly but ultimately attain a degree of saltness equal to 5·32 or 4·32 parts more than sea water. After this every stroke of the engine will take as much

salt out of the boiler by the pump, as is left in the boiler by the steam used in the cylinder for that stroke."

"The engine working quick or slow, the quantity withdrawn bears the same proportion to the quantity left in; and however long the engine may be worked, the water can never be more salt; thus avoiding the evils and inconveniences to which steam vessels have been, hitherto, subject on long voyages, in being obliged to stop to empty, and refill the boilers every fifty or sixty hours, or incur the risk of severe injury to the boilers, from the deposition of salt within them, and a very great sacrifice of fuel the latter part of the fifty or sixty hours, when the water, from the quantity of salt it contains, is very unfit for raising steam."

The second part of the invention is the means to be employed for arresting the heat contained in the rejected water, and returning that heat into the boilers. This is to be effected by running the hot brine into a vessel, and passing the supply-water through a system of pipes or tubes of extended surfaces, immersed in the vessel containing the hot brine, and surrounded by it, in the same way as refrigerators are made to act upon worts. By these means the heat contained in the water or brine, expelled from the boiler, will be principally absorbed by the supply-water, as it proceeds into the boiler, thus compensating in a great degree for the loss of heat which would otherwise be sustained, by removing a portion of the hot water, and introducing other which is cold.

[*Inrolled, April,* 1825.]

To JOSEPH LUCKCOCK, *of Round Cottage, Edgebaston, near Birmingham, in the County of Warwick, Gentleman, for his Invention of Certain Impovements in the Process of Manufacturing Iron.*

[Sealed 15th May, 1824.]

THE improvements in the manufacture of iron, described in this specification, are the employment of muriate of soda, or common salt, in that part of the process called puddling, which is working the pig-iron in a furnace called a puddling furnace, for the purpose of rendering it malleable.

The patentee states, that his improvement, the introduction of salt in the manufacture of iron, is intended only to be applied to the pig-iron, in the puddles furnace, in the state in which it comes from the blast furnace or cupola furnace; and that, under those circumstances, the chemical action of the salt upon the iron produces a great improvement in its quality, in consequence of which a superior article may be rendered at a cheaper price than by the ordinary mode of manufacturing iron.

The salt is to be introduced into the furnace at the time that the iron is breaking down or entering into a state of fusion; the quantity of salt recommended to be used, is about seven pounds weight to every three hundred and a half of pig-iron. The salt is to be pulverized or broken into small pieces, before it is introduced to the furnace. As iron varies in its quality, these proportions will not be found in all cases to answer so well as some small variations; but this can only be known by experience. The patentee prefers to employ such puddling fur-

naces as have iron bottoms, in preference to those which are bedded with sand; the effects of the process being then more certain, and the iron not being liable to take up any foreign matter.

The employment of salt in the preparation or manufacture of iron is not claimed generally, as it may have been used in philosophical experiments; neither is it claimed in any other part of the process of manufacturing iron, except as above said in its application to pig-iron in the state it comes from the smelting furnace, when submitted to the operation of puddling.

Inrolled, November, 1824.

To Thomas Musselwhite, *of Devizes, in the County of Wilts, Saddler and Harness Maker, for his Invention of certain Improvements in the Manufacture or Construction of Collars for Horses or other Animals.*

[Sealed 16th July, 1825.]

These improvements in the manufacture or construction of collars for horses, are designed to prevent the collar from rocking or spreading, which in ordinary collars takes place, after having been some time in use, and by getting out of a proper shape, galls the shoulders of the horse by shifting from the points of bearing. The novel features in this collar are, first, its softness at the bearing points; secondly, its general stability of structure, which arises from the manner of packing it, and from the employment of an iron framing; and thirdly, the introduction of joints or openings at top, by which the collar may be

To CORNELIUS WHITEHOUSE, *of Wednesbury, in the County of Stafford, Whitesmith, for his Invention of Certain Improvements in Manufacturing Tubes for Gas and other purposes.*

[Sealed 26th February, 1825.]

IN our Ninth Volume, page 20, is given the description of an improvement in the manufacturing of metal tubes for gas and other purposes, by Mr. James Russell, of Wednesbury, the present patent is for further improvements upon that process, invented by a workman in the employ of Mr. James Russell, in whom, we understand, the interest of this patent is now become vested; Mr. James Russell is therefore the only manufacturer of these tubes.

The improvement consists in heating the pieces of iron of which such tubes are to be made in a blast furnace, and immediately after withdrawing them from the furnace passing them through swages or other such instruments, in the following manner. First provide a piece of flat iron, commonly called plough-plate iron, of a suitable substance, and width according to the intended calibre of the tube; this piece is then prepared for welding, by being beat up on the sides, or, as it is commonly called, turned over, the edges meeting or nearly so, and assuming the form of a long cylindrical tube. This tube is then to be put into the fire and heated by a blast, and when the iron is upon the point of fusion, it is to be drawn out of the furnace by means of a chain attached to a draw-bench, and passed through a pair of dies of the size required, by which

means the edges of the iron will become welded together.

The apparatus employed for this purpose, is shewn in Plate XIII, fig. 1, which is a side view of the furnace, *a*, and of the draw-bench, *b*, with its spur wheel, *c*, which may be put in operation by a hand-winch, or by attaching its axle to the moving part of a steam engine; *d*, is a screw-press, in which the dies are placed for swagging and uniting the edges of the iron tube, *e*, as it passes through. A front view of this screw-press, with its dies, is shewn at fig. 2.

The iron tube, *e*, having been heated to the point of fusion in the blast furnace, *a*, is drawn out by the chain of the draw-bench, and the screw of the press, *d*, being turned so as to bring the dies to their proper bearing, the two edges of the iron becomes pressed together, and a perfect welding of the tube is effected. The screw-clump or other fastening, *f*, by which the end of the tube is held and attached to the chain, is now opened, and the tube removed; the reverse end is then grasped by the clamp, and that part which has not been welded is introduced to the furnace again, and after being heated is drawn through the dies, and welded in the manner above described.

It is stated that the process of welding these tubes, may be performed without the screw-press and dies above described, by employing a pair of pincers, as shewn in fig. 3, in which a conical hole is made between the two chaps for the tube to pass through, which will have a similar effect to the dies. As the tube, *e*, is drawing out of the furnace by the chain of the draw-bench, a workman brings the pincers and takes hold of the tube, resting the pincers against the front of the standard, *d*, as a steadying

place, and as the tube passes through the hole of the pincers, the welding of the edges of the iron is effected.

The patentee says the above is a correct account of the modes which he employs for welding these tubes, and which he has found to be fully effective; but he does not mean to confine himself to the precise construction of apparatus shewn, as several variations may be made in the apparatus, without deviating from the principles of the invention, which is to heat the previously formed iron tube to a welding heat, that is nearly to the point of fusion, and then, after withdrawing the tube from the fire, to pass it between dies or through holes, by which the edges of the heated iron may be pressed together and the joint firmly welded.

The superior quality of these tubes, compared to those made in the ordinary way, is stated to arise from the iron being considerably improved by the operation of the hollow fire, by which the heat is generally diffused through every part. The length of the pieces of tube thus made is likewise an advantage, as by the above means, pipes or tubes may be made from two to eight feet long in one piece; whereas, by the old modes, the lengths of tube cannot exceed four feet without considerable difficulty, and consequently an increased expence. It is further stated that the tubes are capable of resisting greater pressure, from the uniformity of the heat throughout when they were welded; and lastly, that both their internal and external surfaces are rendered smooth, and greatly resemble drawn lead-pipes.

[*Inrolled, August* 1825.]

To ALEXANDER ROBERTS, *of Monford Place, Kennington Green, in the County of Surry, Gentleman, for his Discovery of a Method of Preserving Potatoes, and certain other Vegetables*

[Sealed 23rd April, 1825.]

THE patentee states, that having directed his attention for several years to the subject of preserving potatoes, so as to prevent their growing, and render them capable of being kept in the hottest climate for a considerable time, and having made a great variety of experiments directed to that object, he has found the following plan to answer the purpose.

"Take potatoes that are thoroughly ripe, and before they have grown in the spring, cut out with a knife or other instrument, or otherwise destroy the eyes or germs. The more they are kept from the air, the finer they will be. Carrots, turnips, and other vegetables, may be preserved by cutting away or otherwise destroying the growing or germinatingparts."

[*Inrolled October*, 1825.]

Such of our readers as do not already know, that destroying the germ of a plant will prevent its germination, will doubtless feel obliged to the patentee for the very expensive way in which he has communicated this piece of information to the public; but as we presume he does not mean to claim the exclusive prerogative of cutting out the eyes of potatoes, we are quite at a loss to discover in what the patent right consists, the specification being perfectly silent upon the subject.

To THOMAS SUNDERLAND, *of Croomshill Cottage, Blackheath, in the County of Kent, Esq. for his Invention of a New Combination of Fuel.*

[Sealed 20th April, 1825.]

THE combination herein proposed, is a mixture of gas-tar, and clay with sawdust or tanner's bark, or the refuse of dyer's wood, or any other species of wood sufficiently granulated or reduced, or peat. The proportions of one quarter gas-tar, one quarter clay, and one half of any of the other ingredients will burn very well; but of course the larger the proportion of tar the more combustible it will be. One third tar, one third clay, and one third sawdust, will burn very brilliantly.

The composition should be well mixed together, and then formed into squares or lumps of any convenient size, and exposed for a few months to the air, after which it will be fit for use. If the lumps can be dried by an artificial heat, it is to be preferred; but the patentee is doubtful whether the application of fire to the drying of the composition would not be too expensive.

[*Inrolled October*, 1825.]

To WILLIAM GRESENTHWAIT, *of King's Place, Nottingham, Gentleman, for his Invention of an Improvement in Air Engines.*

[Sealed 15th March, 1225.

THE patentee has not exhibited drawings of his improvements, and appears to rest his claim of invention in

a great measure upon the general principle he employs, which may be brought into action in several ways.

He proposes to provide a stove or furnace of the kind usually employed to heat rooms, (we presume the insulated stoves placed in the middle of rooms), which is to be coated with fire-clay; and above the fuel he places a plate of metal perforated with holes, upon which is to be laid a quantity of incombustible matter, "in order," (he says), "to accumulate the radiant heat of the fire, and to prevent the passage of any dust into a pipe which I employ to connect the said furnace, or stove, to a cylinder." This cylinder is to resemble the cylinder of a common condensing steam-engine, and the pipe to correspond to the steam pipe of such an engine, having in it a similar cock, and which cock is to be opened and closed as usual.

To the top and bottom of the cylinder is to be attached pipes for the injecting of water, and in these pipes are to be cocks, which open and shut by the action of the engine. To the bottom of the cylinder a pipe is to be attached, with a valve opening outwards, for the purpose of carrying off the condensed air and water, which would otherwise remain in the cylinder after every descending stroke of the piston; and to release the upper part of the cylinder from its condensed air and water, the top side of the working piston is to be made as a cup, or inverted hollow cone, into which the condensation is to fall, and the rod of this piston is to be made hollow for about a foot from the piston, with a valve opening upwards, a hole being made through the said piston rod, to allow the condensed air and water to escape into the open air.

Having thus described the apparatus, the patentee proceeds to explain the manner in which it is to act. He

puts into the stove, or furnace, the necessary fuel, and raises a fire, when he shuts the door of the stove, and turns the fly-wheel of the engine (which it is to be understood is of the same construction as an ordinary condensing steam-engine). The rotation of the fly-wheel moves the piston in the cylinder, and opens the cock which communicates between the cylinder and the stove, or furnace, this occasions a quantity of heated air to pass into the cylinder.

The cylinder being thus filled with heated air, the injecting cock is to be opened, and a jet of water thrown in, which is intended to cool the air within the cylinder, and produce a condensation, and a partial vacuum. " The immediate consequence of this," (the patentee says), "is a rush of air through the above-mentioned stove, or furnace, to the side of the piston opposite to the partial vacuum, which presses down the piston with considerable force, and communicates, through the medium of the piston rod, beam, &c., a motion to the fly-wheel, and this motion continues after the balance of elasticity is restored on both sides of the piston, sufficiently to drive out the condensed air and water through the pipe furnished with a valve opening outwards, or through the piston rod."

The heated air being admitted on the other side of the piston, and the injecting cock opened, a similar operation takes place to that above described, and " this power," (the patentee says,) " is continued to be produced, which may be communicated to any kind of machinery, and may be applied to any of the purposes that the power of steam-engines are applied to."

The only parts of the above apparatus claimed under the present patent, are " the additions made to the stove, or furnace, for accumulating the heat, and interrupting the passage of dust; and the contrivance for freeing the

cylinder from air and water, by a hollow piston rod and valve." The patentee states, that he claims to be "the first and true inventor of the above method of applying heated air, and effecting its condensation for the production of motive power. In other words, I claim to be the first inventor of the above method of producing a partial vacuum, by the condensation of air heated and generated by passing it through a mass of solid combustible substances in a state of ignition."

The specification states, lastly, that the working cylinder should be kept as near to the temperature of the internal air as possible, and that it is also convenient to attach a pipe to the top of the furnace with a cock, by which a communication may be made between the upper part of the stove and the atmosphere, as by this arrangement the engine may be reduced in its power, by simply opening the cock, and a corresponding reduction in the quantity of fuel consumed will also ensue.

Inrolled, September, 1825.

It is quite obvious the patentee has not constructed an apparatus of this kind, or even made experiments upon the subject, or the palpable errors into which he has fallen in his statement would have been manifest. He claims to be the first inventor of the above method of applying heated air, &c.; we speak within compass, in saying fifty persons have claimed the same originality of invention before him; if we are not mistaken, Mr. Dumbells, more than twenty years ago, in his specification of an air-engine, talked of heating his furnace "seven times hotter than Nebuchadnazzar's," but that did not accomplish the object. As to the patentee being the first who has *effected* the condensation of heated air, for

the production of motive power," we perhaps should be ready to admit, if we were not irresistably led to believe that the words should have been *intended to effect.*

Original Communications.

An easy Method of Splitting Rocks to any Dimensions, or in any Line the most desirable.

To the Editor of the London Journal of Arts.

Esteemed Friend,

Not being aware the method I am about to describe is practised in England, if it should be thought worth notice, may I beg its insertion in your valuable Miscellany, the London Journal of Arts, &c.

At the extensive works carrying on at the military colonies in the government of Novogorod, there is a great deal of stone masonry; the stones chiefly granate, some sand stone, and a very hard kind of blue iron stone.

To illustrate the method practised here more fully than it can be explained in writing, I enclose a diagraph, by which it will be seen, at first sight, in what manner the work is performed (see Plate XIII. Fig. 10): A, represents the rock to be split; with regard to its size it is quite immaterial, only more borings will be necessary; B, B, &c. the borings, which are laid down in the direction the line is to be carried, or the rock split. The boring is to be performed in the usual way of boring

rocks with the chisel, C, and hammer, D. The holes in the rock are about two inches diameter; in this establishment two men bore twenty-four uershocks, or three feet six inches, as a day's work; the men are not very dextrous, nor indeed have they much inducement.

I calculate one Englishman, stimulated by a fair reward for his services, and working with good instruments, will perform the same, or more work in the same time; E, the round wedge, in form something like the basis of a cone; *g*, *g*, two pieces of thin iron, made to fit the sides of the wedges, and placed in the holes before the wedges are put in, which diminishes the friction that otherwise would be caused by driving the wedges without them. The wedges are driven with hammers that weigh from sixteen to eighteen pounds, with handles two feet four or two feet six inches long; when the holes are all bored, about six or seven inches deep, more or less, according to the size of the rock, in the direction the rock is to be split, the wedges are placed as before described, and driven alternately by one or more men at the same time, when the operation is soon performed, which generally leaves an even surface, which may be polished with comparatively but little expense; or the rock may be split, so as to be used in rough buildings, without any other labour in polishing them: thus the work is carried on expeditiously, at but a trifling expense. Land that is encumbered with large or unmanageable stones may be cleared with less labour than sinking them under the surface, and the pieces at the same time rendered serviceable for many useful purposes in buildings, &c.

John Gullett.

Military Colonies,
Government of Novogorod, Russia,
7th Month, 1825.

To the Editor of the London Journal of Arts, &c.

Sir,

I beg to ask, through the medium of your useful pages, whether in any instances (and where? and how?) the Flues of *Bakers' Ovens* have been so constructed (which I think they might be,) as to produce the complete combustion of the pit coal now in London generally used to heat them; thereby at the same time to economise coal, and relieve the town from the volumes of dense smoke which the oven chimnies pour out. A manufacturer or tradesman who should have occasion to use a steam-engine, and who by neglecting to carefully use an efficient smoke-burner, should discharge from his engine chimney, in very inferior streets in almost any part of London, as much smoke as common chimneys do in many of our best streets, such manufacturer would be annoyed by indictments, founded on the *recent introduction* of this source of smoke from engines; and yet coal-smoke from ovens has, almost as recently, superceded the burning of bavins of wood by the bakers, which emitted but little smoke. I write this in haste from the office of my son, Mr. Joseph Farey, whose business relative to patents, &c. I am daily attending, during his unfortunate illness; and am,

Sir,

Your obedient servant,

JOHN FAREY, sen.

44, *Lincoln's Inn Fields.*

To the Editor of the London Journal of Arts.

SIR,

ALLOW me to trouble you with the following remarks upon steam navigation, which recent occurrences appear to me to call for. When a panic is raised upon any subject, the public seldom take the trouble of thinking calmly; and, with a view of correcting some improper notions which are rising as to the safety of steam vessels, I am induced to lay before your readers a few observations, which I feel persuaded you will perfectly acquiesce in.

The unfortunate accident of the loss of the *Comet* steam vessel off Greenock has caused great sensation, and is by many persons ignorantly attributed to the inefficiency of steam navigation, whereas unpardonable carelessness in not keeping a look out is the only cause. The Comet was one of those small steam vessels employed upon the river Clyde, in transporting parties of pleasure, and light goods, between Glasgow and Greenock, or the watering places in its neighbourhood; the vessel which run it down is also propelled by steam, and one of considerable burden, employed in navigating among the Scotch islands, and in the Irish sea.

It would have been impossible to have stopped a sailing vessel suddenly, but those which are propelled by steam are so completely under command, that they can not only be instantly stopped, but the *vis enertia* may be overcome and the vessel made to retrograde, by simply turning the paddles in a contrary direction.

It is this perfect command in steering, and the ability to make way against wind and tide, that renders steam

navigation preferable to sailing, and if any danger is to be apprehended, it is from the risk which may occasionally be run, of venturing where a ship with sails could not approach. It may be possible, under such circumstances, that a steam vessel should be overtaken by weather, and entangled by rocks or shoals, in which no ship could possibly live; but under the worst of circumstances, provided the vessel is sea worthy, steam navigation will be found effective where no other means are at all available.

I state this, not from any very extensive experience in navigation, but from having witnessed the beneficial effects of the steam system repeatedly in the British Channel, the German Ocean, and the Irish Sea; situation, avowedly more dangerous and difficult to navigate than perhaps any parts of the globe. I have encountered in the Channel some of the worst of weather during the tempests and gales of the last winter, and the result of my experience, and some little nautical knowledge, induces me to prefer steam navigation under all circumstances.

I had not an opportunity of seeing the *Enterprize* steam ship which proceeded lately to India, but if she is built as strong, and as well formed in her hull as the East India Company's ships are usually made, there is no reason to apprehend any danger from her mode of navigation; on the contrary, there is great reason to expect that her passage will be more expeditious, and that she will avoid many difficulties that a sailing ship must necessarily en-encounter on so long a voyage.

I am, Sir, yours, &c.

PEREGRINE.

Novel Inventions.

Locomotive Carriages.

A NEW line of railway has just been completed, leading from the collieries in the neighbourhood of Darlington to Stockton upon Tees, in the county of Durham (formed under the direction of Mr. Stevenson, the engineer of Newcastle). The waggons are drawn upon plain rails, with curved tops (Birkinshaws, see vol. ii.) by locomotive steam engines. The construction of these engines are not different in principle from those employed upon the Hetton line of railway, near Sunderland; but they exert their power with better effect, and move faster.

The medium speed of the engines and carriages, upon the level parts of the new line, is about six miles per hour, while the speed upon the level of the Hetton line seldom exceeds three miles and a half per hour. This improvement is to be attributed to the increased size of the boiler, and to the employment of larger running wheels.

The weight of the locomotive engine is about seven tons, having a cylindrical boiler ten feet long and four feet diameter, coated with wood, to prevent the radiation of heat, and placed in a horizontal position, with the fire inside the cylinder, and the flue two feet diameter, leading straight through the boiler to the chimney. There are two working pistons moving perpendicularly in cylinders of nine and a half inches diameter; which cylinders are principally immersed in the boiler, and the pistons are packed with hemp.

The steam acts at a pressure of thirty pounds upon every square inch of the boiler, and the safety valve is loaded to the extent of fifty pounds. The induction and eduction valves of both cylinders are worked by rods connected to excentrics below, and the alternating power of the pistons is communicated by parallel motions and sweep rods on each side to cranks upon the spokes of the running wheels; the direction of these cranks upon the fore and hind wheels being at a quarter of a circle removed, in order to overcome the dead points of the strokes of the pistons, and consequently the range of the cranks are two feet. The running wheels being four feet diameter, with flanges on their edges.

The water is supplied to the boiler by pipes leading from a cistern carried in a cart, and attached behind the engine; the same cart also carries the coals for feeding the furnace, which consumes about three quarters of a ton in going a distance of fifty miles.

Certain parts of the line of road rise half an inch in a yard, this the power of the engine overcomes readily, with twenty carriages attached to it, each containing about two tons weight, and proceeds as above said, upon an average, at the rate of six miles per hour. On the first day of opening the rail-way, a train of thirty loaded waggons, and a carriage with passengers, was drawn along some part of the line, at the rate of fifteen miles per hour; but this was doubtless a mere experiment, the ordinary speed is not likely to exceed six miles, as above stated; but this speed, and the employment of a plain rail, is certainly a considerable improvement upon the locomotive carriages near Leeds, which travel upon a rack or cogged rail, and not faster than two and a half or three miles per hour.

Burstall and Hill's Steam Carriage.

The locomotive engine which is to work this carriage is not yet complete, some alterations in the boiler were found necessary, and it is probable that it will not be in a working state much before Christmas. We are enabled to state, from our own knowledge, that this invention has not yet been submitted to trial, that the engine and carriage has never yet been in a working condition, and that though the inventors entertain the most sanguine expectations of its ultimate success, yet they totally disclaim the many tales which have been told in the public prints upon the subject

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Diving Apparatus.

We understand that a patent is soliciting by Thomas Steele, Esq. M. A. of Magdalen College, Cambridge, for some very important improvements in the construction and apparatus of the diving bell. The improved bell, we hear, will enable a directing engineer to descend, and to remain at any depth under water, where he may work without being subjected to endure the pressure of condensed air; and the working itself is rendered much more safe and effective, as Mr. Steele has invented means of perfect communication, by conversation, with those above, which will supersede the present imperfect and insecure system of signals by strokes of the hammer.

Mr. Steele has further invented, by the employment of optical principles, an instrument for the illumination of

objects under water; and improved the means of detaching men from the bell.

Mr. W. H. James has also invented some improved apparatus, by which men will be enabled to work under water. It consists of a hood or helmet, fixed upon the shoulders, which is to be rendered air and water tight, and a vessel, containing condensed air, is to be carried behind the man, from which he is to draw pure air for breathing, by means of valves to be worked by a lever, something like the bellows of bagpipes.

Polytechnic and Scientific Intelligence.

Abstracted Report of the Select Committee of the House of Commons, on Machinery and Artizans, &c.

(Continued from page 211.)

Mr. FRANCIS PLACE examined.

Mr. P. has had experience as to the exportation of machinery to the amount of 100 tons sent to Chili, in South America. It consisted of a flatting mill, and coining presses, articles which are prohibited; but these were passed under orders in Council under the head machinery. The Act 26, Geo. III., cap. 89, forbids the exportation of rolling mills, and it names the parts expressly, as rods, pinions, pillars, and rollers. Application was made for leave to export a flatting mill and coining

presses, but not granted. Application was then made to export the machinery in parts, care being taken to use none of the names mentioned in the act; calling the pillars bars of wrought iron of so many feet in length, &c. Orders were granted in the terms requested, and at the bottoms of some of the orders the words *other machinery* were added. When the orders contained these words, all that could be got ready in time for the ship was put on board.

The witness has been twice at the Custom-house, and had conversation with the head searcher, who shewed him a book containing the name of every prohibited machine, or parts of machines, from which he understood any article not named in that book might be exported. He sent part of a pair of cutting shears and its carriage, which the searcher considered to be a punching press, and seized it. He sent a lathe, with a large regulating screw; this was also seized, the screw being more than one inch and a half diameter. Application was made to Council, stating that the Act 25 Geo. III, prohibited the exportation of lathes, but the Act 26 Geo. III, repealed the preceding, except as to such articles as were particularly named. Lathes not being so mentioned, the application was granted. The witness never found any particular difficulty in procuring orders; always made an entry at the Custom-house, and attended at the wharf with the order.

The searchers have no means of knowing whether the machinery is of the kind prohibited but from their own judgment, or by application to competent persons. On being asked if there was not a great confusion in the present law, replied no, there is not much difficulty in ascertaining its meaning, and determining whether the articles are prohibited are not.

Mr. P. does not think that prohibited machinery can be readily exported in a clandestine manner—has tried, but could not succeed, except in the way stated. He is acquainted with several engineers who frequently export prohibited machinery in the same way. As, however, the engineers seldom export for themselves, the quantity sent abroad is small, compared to what it would be if the laws were repealed. There would be a great demand if the restrictions were removed, particularly in South America. The resources of the governments there are from the customs and the coinage. The Spaniards destroyed all the machinery in Lima, and the new government are desirous of replacing it. An English company have now taken charge of the coinage there. Gold and silver is not allowed to be exported from that country in bars or ingots, under the penalty of death, but the exportation of dollars is allowed on payment of two and a half per cent. duty, therefore an immense quantity of machinery will be required for mining, flattening and coining.

Coals have been recently discovered in a considerable mining district in Columbia and the new mining companies will procure all the machinery to be used, from first breaking the earth, to turning out the dollars from England, if the prohibitory laws are repealed. Considerable quantities of machinery are now ordered for Mexico, and if the laws are not altered, parts only will be sent out, and men must be sent to construct the prohibited parts there. The sending out of machinery might be prejudicial to home manufacture, as far as regards copper sheathing, as a large quantity of copper might be flatted in the northern parts of Chili, but it is doubtful whether it could be sent from thence to China, and the neighbouring islands.

On the subject of workmen combining, Mr. Place stated, that he was a journeyman taylor once, and had been severely punished by the masters for interfering with a combination of that trade; he had subsequently formed several clubs for the purpose of compelling masters to give proper wages to the men. Formerly no man in the leather breeches trade could earn more than fourteen shillings a week, while in other trades the men could earn a guinea. Under his direction, therefore, a society was formed, and within two years from its commencement the masters were obliged to advance their wages. These attempts have generally been successful, but they have been attended with great trouble, and ill-will on both sides.

Mr. P. thinks that the existing combination laws produce no good effect, they are wholly pernicious; they have kept the men together, when no combination would have otherwise existed. They are considered by the men as designed to keep down their wages, and are therefore considered as oppressive. The laws have really little or no effect; in some particular trades, they have kept wages too low, the type founders for instance in London; the masters do not exceed ten, and a close combination has at all times existed. The same has occured among the saddlers, but their number being larger it has had but little effect. The journeyman tailors have a perpetual combination, and a combination among the masters is of no avail. The system is all but a military one, there is no resisting it. There are upwards of twenty *flint* houses of call in London; each has a delegate, and they elect five others which are technically called *The Town*. The power of these five men is almost unlimited over the trade, and obedience follows of course; the whole body never discuss

the propriety of any measure that is ordered. If the present law was repealed, this combination would in time cease to exist. Apprehension of prosecution at present causes unlimited confidence, if the cause were removed, the effect would cease.

The witness desired not to be understood as complaining of the law as it now exists; it is equally useful both to masters and men; if the laws were repealed, the good would remain, and the evil would be put an end to; the demands have not been unreasonable; the laws have only created irritated feelings. The moral conduct of the journeymen tailors is greatly improved, twenty years ago there were few shops without a gin bottle, from which the men drank as they liked, and made a general score, now there is not perhaps a shop in London where the same occurs. There are different degrees of organization among trades, but that of the tailors is most perfect.

It is nearly impossible for masters to be prosecuted to conviction for combining; to prosecute, money must be raised, and there must be a combination of the men to do this, which might be prosecuted by the masters; there would in that case be a cross prosecution. The combination laws compel men to give evidence against each other; but no law compels the masters, so it is almost impossible to convict a master. The laws in this respect are unequal and unjust.

The different trades sometimes assist one another, the tailors have given the most, being a large body, they have given an hundred or two pounds at a time in this way, which is entirely owing to the combination law.

New Mode of preparing Paper for the Use of Draughtsmen, &c., by Mr. Couder.

REDUCE to a powder, and dissolve quickly in a glazed earthen vessel, containing cold water, some gum adragant, having been well worked with a wooden spatula to free it from lumps. There must be a sufficient quantity of water, to give to this diluted gum the consistence of a jelly. Paper, and some sorts of stuffs, upon which, if this composition be smoothly applied with a pencil, or a brush, and dried before a gentle fire, will receive either water or oil colours; in using water colours, they must be mixed with a solution of the above gum. This cloth or paper, so prepared, will take any colour except ink. When it is intended to retouch any particular part of the drawing, it should be washed with a sponge, or clean linen, or a pencil, (containing some of the above-mentioned liquid); if the part is only small, it will then rise quickly and appear as if repainted.

A Composition to render Wood Fire-proof, by Doctor Fuchs.

DOCTOR FUCHS, member of the Academy of Science, at Munich, is said to have discovered a composition by which he renders wood incombustible; the composition is made of granulated earth, and an alkali. To obtain this composition, the inventor says, you must dissolve some moist gravelly earth, which has been previously well washed, and cleared from any heterogeneous mat-

ter, in a solution of caustic alkali. This mixture has the property of not becoming decomposed by fire or water. When spread upon wood, it forms a vitrius coat, and is proof against the two elements. The building committee of the royal theatre have twice publicly tried the efficacy of the composition on two small buildings of six or eight feet in length, and of a proportionate height; the one was covered with the composition, and the other built in the usual manner. The fire was put equally in the two buildings; the one which was not covered with the composition was consumed, whilst the other remained perfect and entire. The cost of this process is very insignificant compared to its great utility, being about two francs three centimes per 100 square feet.

The royal theatre at Munich has undergone this process, having about 400,000 square feet; the expense of which was about 4 or 5000 francs.

The late Earl Stanhope made some very successful experiments upon this subject, he coated a building with sand and glue, which proved perfectly fire-proof.—EDITOR.

New Patents Sealed, 1825.

To William Duesbury, of Bosel, in the County of Derby, colour manufacturer, for his having discovered a mode of preparing or manufacturing of a white, from the impure native sulphate of barytes—Sealed 29th September—6 months for inrolement.

To John Martineau, the younger, of the City Road, in the county of Middlesex, engineer, and Henry William Smith, of Lawrence Pountney-place, in the city of London, Esq., in consequence of a communication made to them by a certain foreigner, for the invention of certain improvements in the manufacture of steel—6th October—6 months.

To Sir George Cayley, of Brompton, in the county of York, Baronet, for his having invented a new locomotive apparatus—6th October—2 months.

To James Shudie Broadwood, of Great Pultney-street, Golden-square, in the parish of Saint James, in the county of Middlesex, piano-forte maker, for his invention of certain improvements in small, or what are commonly called square piano-fortes—6 October—6 months.

To Thomas Howard, of New Broad-street, in the city of London, merchant, for his having invented an engine, which he intends to call or denominate, a vapour engine—13th October—6 months.

To Nathaniel Kimball, of New York, but now residing at Falcon-square, in the city of London, merchant, in consequence of a communication made to him by a certain foreigner, residing abroad, for the invention of a process for converting iron into steel—13th October—6 months.

To Benjamin Sanders, of Broomsgrove, in the county of Worcester, button manufacturer, for his invention of certain improvements in constructing or making of buttons—13th October— 6 months.

To Thomas Dwyer, of Lower Ridge-street, in the parish of Saint Audean, in the county of the city of Dublin, silk manufacturer, for his invention of certain improvements in the manufacture of buttons—13th October—6 months.

To Joseph Clesild Daniell, of Stoke, in the county of Wilts, clothier, for his invention of certain improvements in machinery applicable to the weaving of woollen cloth —13th October—6 months.

To Josiah Easton, of Heal Cottage, in the parish of Bradford, in the county of Somerset, Esq., for his invention of certain improvements in locomotive or steam carriages, and also in the manner of constructing the roads or ways for the same to travel over—13th October —6 months.

To William Hirst, and John Wood, both of Leeds, in the county of York, manufacturers, and John Rogerson, of Leeds aforesaid, mill-wright, for their invention of certain improvements in machinery, for raising and dressing of cloth—21st October—6 months.

To Ralph Stephen Perumberton, and John Morgan, of the parish of Lanelly in the county of Carmarthen, for their invention of a consolidated or combined drawing and forcing pumps—21st October—2 months.

To Goldsworthy Gurney, of Argyle-street, Hanover-square, in the county of Middlesex, surgeon, for his invention of certain improvements in the apparatus for raising or generating steam—21st October—6 months.

To Lemuel Wellman Wright, of Princes-street, Lambeth, in the county of Surrey, engineer, for his invention of a certain improvement in the construction of steam engines—21st October—6 months.

To Henry Constantine Jennings, of Devonshire-street, Portland-place, in the county of Middlesex, practical chemist, for his invention of certain improvements in the process of refining sugar—22nd October.—6 months.

D.	H.	M.	S.	
1	2	0	0	☾ in conj with ζ in Gem.
1	15	19	39	♃'s 3rd Sat. will emerge.
1	18	17	45	♃'s 1st Sat. will immerge.
3	5	0	0	☾ in conj. with 1 α in Canc.
3	6	0	0	☾ in conj. with 2α in Cancer.
3	6	21	0	☾ in □ last quarter.
3	9	0	0	☿ in conj. with 2 α in Libra.
4	2	0	0	☾ in conj. with ο in Leo.
4	11	0	0	☾ in conj. with π in Leo.
4	14	56	40	♃'s 2nd Sat. will emerge.
7	5	0	0	♀ in conj. with d in Virgo.
8	5	0	0	☾ in conj. with ι in Virgo.
8	15	49	43	♃'s 3d Sat. will immerge.
9	21	13	0	Ecliptic Conjunction or ● New Moon.
10	7	0	0	☽ in conj. with ☿ long. 23° in Scorpio ☽ lat. 2° 12′ S. ☿ lat. 44′ S. diff. lat. 1° 28′.
10	14	39	43	♃'s 1st Sat. will immerge.
10	17	0	0	☽ in conj with δ in Scorpio.
11	10	0	0	☿ in conj with η in Libra.
11	17	30	0	♃'s 2nd Sat. will immerge.
12	20	0	0	☽ in conj. with 1 μ in Sag.
12	21	0	0	☽ in conj. with 2 μ in Sag.
13	23	0	0	☽ in conj. with α in Sag.
14	6	0	0	☿ in conj. with δ in Scorpio.
15	3	0	0	☽ in conj. with β in Cap.
15	14	17	37	♃'s 4th Sat. will immerge.
16	23	31	0	☽ in □ first quarter.
17	16	33	10	♃'s 1st Sat. will immerge.
20	15	0	0	♀ in conj. with η in Virgo.
21	22	0	0	♀ in conj. with λ in Virgo.
22	1	16	0	☉ enters Sagitt.
23	23	0	0	☽ in conj. with δ in Aries.
24	18	26	35	♃'s 1st Sat. will immerge
25	0	0	0	☽ in conj. with A in Tau.
25	3	24	45	Beginning } Eclipse of the ☽ partly visible at Greenwich.
	4	11	45	Ecliptic opposition or ☉ full moon
	5	19	0	End.
25	9	0	0	☾ in conj. with 2 η in Tau.
25	12	0	0	♂ in conj. with η in Virgo.
25	17	0	0	☿ in conj. with A in Oph.
26	2	0	0	☾ in conj. with ι in Taurus.
26	12	0	0	☾ in conj. with ♄ long. 19° in Gemini ☾ lat. 43′ S. ♄ lat. 1° 34′ S. diff. lat.
26	12	54	54	♃'s 1st Sat. will immerge.
26	17	0	0	☿ in conj. with d in Oph.
27	9	0	0	☿ in conj. with β in Oph.
27	10	0	0	☾ in conj. with η in Gem.
27	14	0	0	☾ in conj. with μ in Gemini.
27	16	0	0	☾ in conj with ν in Gem.
28	8	0	0	☾ in conj. with ζ in Gem.
28	14	0	0	♀ in conj with 2 α in Libra.
29	11	53	43	♃'s 2nd Sat. will immerge.
30	11	0	0	☾ in conj. with 1 α in Can.
30	12	0	0	☾ in conj. with 2 α in Can.

The waxing ☽ moon—the waning moon ☾

Rotherhithe. J. LEWTHWAITE.

METEOROLOGICAL JOURNAL, SEPTEMBER AND OCTOBER, 1825.

1825.	Thermo.		Barometer.		Rain in inches.	1825.	Thermo.		Barometer.		Rain in inches.
	Higt.	Low.	+	—			Higt.	Low.	+	—	
SEP.						OCT.					
15	67	58	29,70	29,48	,475	6	67	54	30,00	29,83	,025
16	68	47	29,78	29,77	,05	7	61	50	29,98	29,54	,625
17	68	57	29,79	29,77	,35	8	64	37,5	30,00	29,61	,025
18	66	53	29,77	29,74	,225	9	60	46	30,00	29,85	
19	67	59	29,76	29,70	,05	10	65	48	30,20	30,10	
20	72	51	29,70	Station		11	62	48	30,28	30,26	
21	62	57	29,59	29,54	,075	12	61	46	30,10	Station	
22	65	54	29,73	29,56	,125	13	63	47	30,10	30,01	
23	63	40	29,94	29,87		14	61	43	30,10	30,09	
24	70	48	30,00	29,96	,025	15	59	36	30,40	30,30	
25	70	60	30,00	Station		16	60	34	30,40	30,29	
26	66	54	29,90	Station	,5	17	69	36	30,19	30,04	
27	63	44	30,14	30,03		18	52	35	30,06	29,70	,005
28	66	40	30,25	Station		19	56	40	29,40	28,94	,275
29	59	44	30,20	30,06		20	42	31,5	29,22	28,95	
30	60	44	29,95	29,89		21	43	34	29,43	29,30	
OCT.											
1	62	49	29,83	29,76	,275	22	53	36	29,92	29,72	
2	65	54	29,67	Station	,225	23	50	26,5	30,00	29,94	
3	63	50	29,64	29,60	,4	24	59	38	29,92	29,80	
4	64	54	29,84	29,72	,125	35	48	36	29,84	29,80	
5	65	55	30,00	29,72							

CHARLES H. ADAMS, LOWER EDMONTON.

LITERARY AND SCIENTIFIC NOTICES.

Moscow.—The Emperor of Russia has sanctioned a Technological Institution, the object of which is to advance the sciences necessary to the prosperity of manufacturing industry. Young people of a respectable condition, from sixteen to twenty-four years of age, are to be admitted into it, and to receive instruction gratuitously.

A Mr. Croudaces, of Leeds, is preparing some improved "Tables of Interest," doubly indexed; to which are added Tables of Commission.

A New Plough.—A farmer in Moravia, it is said, has just invented a new plough, which although drawn by a single horse, produces four furrows. The Agricultural Society of that country have presented him with a gold medal.

Durable Carmine.—In addition to the lake colours produced in all their variety of brilliancy from madder, Mr. Field has enriched the world of art, by obtaining the finest carmines from the same vegetable, and of a quality well adapted for incorporating either with oil or water.

Captain Brooke is on the eve of publishing the two following works, to complete his travels in the North: "Travels through Lapland and Sweden, in the Winter Season; with various observations relating to Finmark and its Inhabitants, made during a short residence at Hammerfest, near the North Cape:" "Winter Sketches in Lapland; or Illustrations of a Journey made with Rein-deer, from Alten to the Shores of the Polar Sea, in 69° N. L. through Norwegian, Russian, and Swedish Lapland, to Tornea, at the extremity of the Gulph of Bothnia; intending to exhibit a complete view of the mode of travelling with Rein-deer, the most striking incidents that occurred during the Journey, and the general character of the Winter Scenery of Lapland."

Menai Bridge.—This stupendous undertaking is almost completed. The chains have been finally laid across from pier to pier, enabling persons to pass to and fro, from Caernarvonshire to the Island of Anglesey. In the course of a few months, it is supposed, the structure will be in common use.

A new Periodical Work, to be called the Gardener's Magazine, and Register of Rural and Domestic Improvements, to be conducted by J. C. Loudon, F. L. S. H. S. &c. is announced to appear at Christmas. To be continued Quarterly.

In the Press, from the pen of Mr. Forsyth, author of the New London Medical Pocket Book, &c. A New Medical and Surgical Dictionary, including the collateral branches of Philosophy and Natural History, as connected with Materia Medica.

Nearly ready for publication, in one vol. octavo, The Principles of Analytical Geography, designed for the use of Students, by H. P. Hamilton, M. A. &c. Fellow of Trinity College, Cambridge.

Arctic Land Expedition.—The accounts received from Captain Franklin and Dr. Richardson, are to the 22nd of April; but are said to contain nothing new worthy of notice. The expedition was at Penetanguishene on Lake Huron; and on the eve of starting in canoes for its ulterior destination. The season was fortunately very early.

The loss of the Fury, one of the ships under the command of Capt. Parry, on the Arctic survey, has compelled the expedition to return without accomplishing any new discovery. It is said that great neglect is attributable to the officer who had the direction of that vessel.

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SHACKELL, ARROWSMITH, AND HODGES, JOHNSON'S-COURT, FLEET-STREET.

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No. LXI.

Recent Patents.

To John Heathcoat, *of Tiverton, in the County of Devon, Lace Manufacturer, for his Invention of Improvements in certain parts of the Machinery used in Spinning Cotton-wool or Silk.*

[Sealed 20th March, 1824.]

In order to point out the object of these improvements, the patentee has referred generally to the common construction and operation of that description of spinning machinery, called stretching-frames, mules, and jenneys; and particularly to a peculiar construction of stretching-frames, mules, or jenneys, shewn in the drawing accompanying his specification, in which the winding up of the rovings into copts is effected without any assistance or guidance from the hands of the spinner. This last mentioned or improved construction of stretching and spin-

ning frames, is not however claimed under the present patent, and appears to be exhibited merely for the purpose of shewing the situations in which the new invented parts are to be introduced, and their objects. The operations of the whole machinery is therefore explained in a general way only, and the drawing, which is extremely rude, shewn in Plate XIV, fig. 1, gives but an imperfect representation of its parts.

In the ordinary stretching-frames, mules, and jenneys, the carriage which contains the series of spindles, is conducted backward and forward by the hand of the spinner upon wheels, the peripheries of which run on iron rails raised upon the floor of the building. The loose spun filaments or rovings of cotton, or other material, are drawn from copts, and conducted through rollers placed in fixed standards. These rollers are allowed to turn and deliver a certain length of roving to the spindles as the carriage is drawn backward, and then the rollers becoming fixed confine the ends of the rovings, while the carriage continuing to recede, stretches out the filaments, and by that means draw the rovings fine: the spindles all the while revolving with great velocity twist the filaments together, and spin them into threads. The carriage having now receded to its greatest distance, the rotation of the spindles are stopped, and they are made to perform a few turns the reverse way, in order to release the thread coiled round the ends of the spindles; a long wire or rod extending across the machine, is now brought down by means of a lever upon the threads, and as the carriage advances, (the spindles revolving as before), the thread winds upon each spindle into a copt or ball. The retiring of the carriage again produces another length of thread in the same way as above described, and thus by the continued traversing of the carriage, and ro-

tation of the spindles, the rovings of cotton or other filaments become drawn and spun into an extended length of thread.

It is here to be observed, that the uniformity of the spinning, by the above described machinery, depends upon the care of the spinner, who has to perform the several movements at regular intervals; but it is said that in the improved machinery exhibited in the figure, that dependance upon the spinner is dispensed with, as all the evolutions are effected by the combined mechanism when put in action by a first mover. These movements we cannot however completely trace by the description and drawing given, and are therefore obliged to assume the office and movements of some of the parts, but any mistake which we may be thus drawn into will not affect the merits of the patent, as the improvements claimed consist merely in two particulars,—a cone and an executric wheel, marked A and B, in Plate XIV. fig. 1.

Three pairs of drawing rollers are situated at *a*, between which the rovings of cotton pass to the spindles, *b*. Of these drawing rollers there are a series extending across the machine, mounted on standards, and made to revolve by toothed gear upon the ends of their axles. The spindles, *b*, of which there are a series, are placed in bearings upon a carriage, *c c*, which runs upon wheels to and fro along the iron rail, *d*. These spindles are moved by cords and pullies, which are actuated by the rotation of the large wheel, *e*. When the carriage has withdrawn a certain distance from the rollers, *a*, and taken certain lengths of rovings, the rollers become fixed; and as the carriage moves onward to the extent of its race, the lengths of roving are stretched out so as to elongate their filaments and draw them fine; the spindles at the same time being kept in rapid rotation by the cords passing

round the rotatory drum, *f*, the filaments become spun into threads. These threads are now to be wound upon the spindles, which have conical cores, A, made of paper, cork, or some other light material, and to effect this as the carriage advances, an arm acts against a lever that moves a clutch box on the axle of the wheel, *g*, and brings the previously stationary wheel, *h*, into operation, and upon the same axle there is also a snail-wheel acting against a rod that moves the lever, *i*, by which means the fallen wire is actuated, that guides the threads as they wind up and down upon the surface of the core of the spindles.

As the diameter of the core, A, of the spindle upon which the threads are to be wound, increases from the point downward, the speed of the carriage must vary in order to allow the threads to wind with a uniform tension, this is effected by passing the cord or band, *k*, by which the carriage is drawn round the periphery of an excentric or heart-shaped pully, B, so that at the beginning of the winding, when the thread coils about the point of the cone, the carriage moves slower, and as the thread coils upon the larger part or base of the cone, the carriage moves faster.

There are several parts of the machinery designed merely to regulate the operations; but these we are not prepared to describe for the reasons before given, and conclude with the patentee's claims, which he expresses in these words: "I claim only as my invention the cone or conical form of the paper, cork, or other proper material, A, which is placed upon the spindle, and on which the roving or yarn is wound; and the excentric pully, B, which draws in the carriage at a variable speed."

[*Inrolled, September*, 1824.]

To SAMUEL CROSLEY, *of Cottage Lane, City Road, in the County of Middlesex, Gentleman, for his Invention of an Improvement in the Construction of Gas Regulators or Governors.*

[Sealed 1st Febuary, 1825.]

THIS is an instrument for the purpose of regulating the discharge of gas through any opening or burner, in order that it may issue with a uniform velocity, notwithstanding a variation may have taken place in the pressure within the supply pipes. This object has already been effcted in two ways, by passing the gas through apertures capable of being expanded or contracted by the varying pressure of the gas itself. One of these modes is by means of a small gasometer or inverted vessel, the mouth of which is immersed in water, the gas proceeding from the supply pipe to the exit is made to pass through this gasometer, and the top of the inverted vessel is loaded with weights so as to keep the gas under a pressure, just sufficient to force it through the burner; in the middle of the inverted vessel, a rod is suspended with a conical plug at the bottom, passing through the aperture by which the gas enters, and when any extra pressure is exerted upon the gas in the supply pipe the inverted vessel becomes raised, and the conical plug passing further into the aperture partially closes it, and necessarily impedes the progress of the gas; on the contrary, when the pressure of the gas in the supply pipes becomes reduced, the inverted vessel sinks, and the conical plug descending below the aperture leaves the way open for the full and free

passage of the gas. The other mode is by connecting the rod bearing the cone to the upper movable board of an air tight vessel, made to collapse like organ bellows, and the entrance and exit apertures being in the bottom part, with the cone acting in the former; any increase or diminution in the pressure of the gas will cause the upper board to move, and that moving the cone will contract or enlarge the entrance aperture, and regulate the supply of gas in the same way as above described.

The present improvement consists in employing a small tank with the entrance aperture in the bottom, and having a light flexible medium as a false top, from which is suspended the rod and cone before mentioned. This apparatus is shewn in section in Plate XIV. fig. 5; *a a a a*, is the tank, made of any suitable material, having its joints air tight; about half way up within the tank is a ledge, *b b*, extending round it, and upon this ledge is laid the edges of a thin flexable sheet, *c*, made of goldbeater's skin, or any other light air tight flexible substance, which is held securely all round by a flat ring, luted and screwed, or otherwise fastened close down upon the ledge, *b*. In the middle of the flexible sheet, *c*, is a circular card, from which is suspended the rod of the cone, *d*.

The gas passing through the supply pipe, *e*, enters the box, *f*, and proceeds through the central aperture into the tank, *a a*, from whence it passes off by the pipe, *g*, to the burner. There are small weights laid upon the central part of the sheet, *c*, for the purpose of resisting the buoyant force of the gas in passing and keeping the sheet down as shewn in the figure; but when the pressure of the gas in the pipe increases sufficiently to overcome the resistance of the weights, its force raises up the flexible sheet as shewn by dots, and the cone rising also partially closes the aperture, and thereby the passage of the gas

into the tank is impeded, and the burner supplied under a uniform pressure with its requisite quantity of gas.

[*Inrolled August,* 1825.]

In a recent number of the Repertory of Arts, this invention is very intelligibly described in the following words: "The regulator consists in a cup, which he (the patentee) *improperly* calls a *tank*, whose mouth is covered with gold beater's skin;" and in a note subjoined, the Editor indulges his readers with this learned criticism. "We object to the cup or vessel of this regulator being called a *tank*, because this word which we have imported from the East Indies, really means a large artificial pond of water, and therefore is not a proper appellation for a small vessel, either directly or figuratively."

We have also imported from the Dutch a word of very similar signification, *tankard*, which we are rather disposed to think this sapient critic had searched to the bottom of, before he found the above learned objection.

EDITOR.

To GEORGE VAUGHAN, *of Sheffield, in the County of York, Gentleman, for his Invention of an Improvement or Improvements on Steam Engines, by which means power will be gained and expense saved.*

[Sealed 1st May, 1824.]

THE object of this invention appears to be the union of the two cylinders of a steam-engine, end to end, so as

to appear externally like a column, consequently connecting the action of the two pistons together by vertical rods.

Plate XIV. fig. 6, is a vertical section of the two cylinders, *a* and *b*, open at their ends, and cast or otherwise formed in one piece, in which the pistons, *c* and *d*, work in the same manner as in ordinary condensing atmospheric engines. At the outer ends of the piston rods cross pieces, *e*, *e*, are attached, and to these are affixed the perpendicular rods, *f*, *f*, which pass between the cylinders and their jacket, and unite the actions of the two pistons. The jacket or outer case of the cylinders is designed, as in other engines, for the purpose of retaining steam, in order to keep the cylinders hot; and the slide valve, *g*, for performing the induction and eduction, is to be worked in the same manner as usual.

Let it be supposed that steam is proceeding by the pipe, *h*, into the box, *i*; the induction psssage being now open to the cylinder, *b*, the elastic force of the steam will project the piston, *d*, along that cylinder, and at the same time the aperture of the cylinder, *a*, being in connection with the eduction pipe, *k*, through the slide valve, *g*, a vacuum will take place in *a*, and the piston, *c*, by the pressure of the external air is made to proceed along its cylinder in the same direction as *d*. The slide valve, *g*, being now moved downwards, the aperture of the cylinder, *a*, is then opened to the admission of steam, and that of the cylinder, *b*, to the exhaustion, by which means the pistons ascend again, and thus by the alternate action of the pistons power may be communicated to move machinery, as from other steam engines.

[*Inrolled October*, 1824.]

To Samuel Crosley, *of Cottage Lane, City Road, in the County of Middlesex, Gentleman, for his Invention of a certain Apparatus for Measuring and Registering the Quantity of Liquids passed from one place to another.*

[Sealed, 1st February, 1824.]

This apparatus is called by the patentee a *liquid meter*, and is designed to measure the quantity of water, wort, or any other liquid passed through it from one vessel or elevation to another. There are two modes of constructing it, exhibited in the specification, which are susceptible of variations in their forms.

Plate XIV. fig. 2, is a box, containing the measuring apparatus shewn in section, which consists of a hollow drum revolving upon its axis; this drum is divided into several compartments with outlets, and may be made in the same form as the machines commonly employed for the measuring and registering of gas, called *gas-meters*; fig. 3, is a cross section of the same, and the respective letters refer to similar parts in each.

The liquid is conducted into the measuring wheel by a pipe, *a*, at the axis, and flowing through the aperture into the compartment, *b*, produces a preponderating weight on one side of the drum, which causes it to revolve, and that compartment becoming filled with the liquid, *c* will assume its position, and then *d*, and so on in succession as the drum revolves, the liquid discharging itself at the apertures in the periphery of the drum into the lower part of the cylindrical chamber, *e e e*, from whence

it flows over and descends by the flat tube, *f*, into the receptacle at bottom of the box, and is there drawn off, as may be found desirable.

The several compartments, *b*, *c*, and *d*, made of equal and known capacities, having been filled in succession so many times, the measured quantity of the liquid that has passed through the machine is registered by a train of counting wheels, connected to the axis of the drum, with an index moving round a dial-plate, and the quantity is made known by inspection. The form of the partitions may be varied in several ways, the sides being made perfectly air-tight.

The difference between this machine and a gas meter is, that in the latter the gas to be measured occupies the upper part of the drum, the lower being filled with water as a resistance; whereas in the former the liquid to be measured flows through the lower part of the drum, and the upper part is occupied with atmospheric air.

The other construction of meter for ascertaining the quantity of water or other liquid passed through it, is shewn at fig. 4. It consists of a double trough, *a* and *b*, the sides of which are at right angles; this trough is placed within a box, *c c*, and tumbles over upon an axis on which it is balanced, with stops or rests on the sides of the box to limit the extent to which the trough shall fall over on either side. The liquid to be measured flows from a pipe, *d*, immediately over the axis of the double trough, and having occupied the trough, *a*, sufficiently to cause the weight of the liquor on one side to preponderate, the trough then tumbles over to the other side, discharges its contents into the receiving vessel below, and brings the trough, *b*, up into a situation capable of receiving a similar quantity of liquor. Thus a succession of vibra-

tions of the trough, each time discharging an equal quantity of liquid, will determine by a train of counting wheels connected to its axis, and an index, the quantity of liquid that has passed through the machine.

These measuring machines must be enclosed in a close air-tight vessel, which the patentee calls an air vessel. "The capacity of the air vessel must be such as to admit of sufficient compression of the air, and must therefore depend on the extent of the pressure of the column to which the liquid meter is exposed, and it must be sufficiently large to allow space for the measuring machinery to work without its being interrupted. The well known law of compression of air will determine the size of the vessel, adapted to any particular situation, and it is unnecessary to enter into a detail of the particular dimensions applicable to all the various cases to which apparatus of this description is to be applied."

The patentee further states, that he does "not claim originality in the construction of the measuring wheel, or drum, of the measuring trough, or in their application to the measuring of liquids when used without the air vessel. I claim the combination of the air vessel with the measuring apparatus, by which means liquids passing from one place to another from any elevation, and occasioning therefore any degree of pressure, may be measured and registered."

[*Inrolled, August,* 1825.]

To JOHN POTTER, *of Smedley, near Manchester, in the County Palatine of Lancaster, Spinner and Manufacturer, for his Invention of certain Improvements in Looms, to be Impelled by Mechanical Power for Weaving various kinds of Figured Fabrics, whether of Silk, Cotton, Flax, Wool, or other Materials or Mixture of the same; part of which Improvements are applicable to Hand Looms.*

[Sealed 13th May, 1825.]

THE specification of this patent is of very considerable length, and accompanied by a most elaborate sheet of drawings, exhibiting and describing every part and operation of a power loom, slightly varied in construction from other power looms already before the public, (see Bowman's Patent, Vol. II. page 161, and plate VII.); but as the patentee disclaims any right of originality in such a machine, and confines his claim of invention to certain particular novelties introduced and combined with the existing machinery, we shall briefly describe its general construction and action, and then point out particularly the nature and design of the improvements.

Plate XV. fig. 1, is an end view of the loom, with the improved parts attached. The warp threads, *a*, extending through the loom, pass from the warp rollers, *b*, *b*, over the beams, *c*, *c*, to the work rollers, *d*, the former giving out the warp as required, and the latter coiling up the cloth or other fabric, as it is made; *e*, is the lay, with the reed,

swinging upon arms, *f*, in which the shuttle carrying the weft ~~warp~~ thread is moved to and fro by the rods, *g*. The oscillations of the lay is produced by arms, *h*, connected to a crank on the main axle, *i*. This axle is turned by a band and rigger actuated by any first mover, and gives motion to all the operative parts of the loom. This loom is designed to produce patterns or figures in the cloth, silk, or other fabrics, woven in it, and is furnished with a contrivance to work the warps accordingly.

A series of heddles or helds, *k*, *k*, are mounted upon cords which are attached to the top and bottom levers, *l* and *m*, and as these levers rise and fall, the heddles with # certain of the warp threads attached to each, move up and down, also between every throw of the shuttle. The disposition of the warp threads either above or below the weft, when woven, produces the figures or pattern, and the movements of the respective heddles before each throw effects this object.

The contrivance by which the levers are to be moved is very similar in part to the mechanism of a barrel-organ, and also partakes of the principal of the Lyon's looms; *n*, is a cylinder or barrel, the periphery of which is divided by a number of circular lines circumscribing it, corresponding to the number and positions of the bent levers, *m*; it is also divided lengthwise parallel to the axis into as many straight lines at equal distances apart as there are to be throws of the shuttle in completing the pattern, (say forty-eight.) In every intersection of these lines a hole is to be made for the purpose of sticking in a peg, and the placing of these pegs around the cylinder, *n*, will be tantamount to reading in a pattern in the loom, and similar in operation to the projections upon an organ or chime barrel.

There are to be two of these cylinders upon the same axle, which is supported by arms, *o*, called the swinging frame; and corresponding to the pegs raised up on one cylinder, are to be blanks on the other, and *vice versa.*

To the main axle, *i*, an excentric grooved wheel, *p*, is attached which turns with it, and in this excentric groove a small friction roller runs which is connected to the adjustable arm of the swinging frame, *o*. As the excentric wheel, *p*, goes round the swinging frame, *o*, and also the pattern cylinders, *n*, are made to rise and fall, and in falling the pegs of the pattern cylinder strike against pins at the ends of the bent levers, *m*, and cause them to draw down certain heddles, while those levers which are opposite to the blank parts of the cylinder, *n*, remain up, or in other words, the corresponding pegs of the other or centre cylinder act upon and raise them. Thus certain of the levers, *m*, are raised, and others depressed, for the purpose of producing the pattern.

At every revolution of the main axle, *i*, a driver, *r*, worked by a crank and rod, pushes the wheel, *s*, called the pattern wheel, one tooth forward, which wheel being fixed upon the axle of *n*, drives the cylinders also, and brings the next row of pegs into operation, so as to act upon the several levers, and effect a different disposition of the heddles, and the warp, suited to the production of the part of the pattern then forming. In order to confine the upward action of the levers, *m*, a straight bar or weight, *t*, is introduced, connected to arms at each end, and which lies upon the levers and prevents them from rising.

The particular parts of the machinery, claimed under this patent, are, 1st, the excentric grooved wheel, *p*, which carries the friction roller for moving the frame and pat-

tern cylinders; 2nd, the swinging frame, *o*, and its appendages for adjusting the position of the pattern cylinders; 3rd, the pattern wheel, by which the pattern cylinders are turned progressively, one tooth at a time; and 4thly, the balance weight or straight bar, *t*, for confining the upward action of the levers.

The patentee, lastly, states, that these improvements, excepting the excentric wheel, are also applicable to hand looms, and he therefore claims the exclusive right of so applying them.

[*Inrolled, November*, 1824.]

To WILLIAM JOHNSON, *of Great Totham, in the County of Essex, Gentleman, for his Invention of a means of Evaporating Fluid, for the purpose of Conveying Heat into Buildings, for Manufacturing, Horticultural and Domestic Uses: and for Heating Liquors in Distilling, Brewing, and Dyeing: and in making Sugar, and Salt, with reduced expenditure of Fuel.*

[Sealed 5th August, 1824.]

IN our Sixth Vol. page 128, will be found the specification of a patent granted to the above Mr. Johnson, for "a means of obtaining the power of steam for the use of steam engines, with reduced expenditure of fuel." This was proposed to be effected by placing one vessel above another, each containing water, and allowing the heat of the steam in the lower vessel to ascend through the bottom of the next above it, and then to cause the water to

boil and generate steam, the heat from which was to pass through the bottom of the next vessel above it, and so on, steam being generated from all the vessels by the heat of the one fire at bottom; or by immersing vessels containing water within one principal boiler, and generating steam from all the supplementary vessels by the heat communicated from the steam of the principal boiler.

The object of the present patent is that of employing steam *generated this way* for the heating of buildings generally, whether for domestic, horticultural, or manufacturing purposes, and also for heating liquors, in which brewing, distilling, dyeing, and sugar and salt boiling, are particularly mentioned. The mode proposed is by laying lateral pipes leading from the respective supplementary boilers, arranged as above described, to the vessels or chambers of whatever form or kind used for the several purposes above enumerated, but the employment of steam generated in the ordinary way to those purposes is not claimed, particularly as respects the evaporation of brine, for the production of salt, which is practised at Droitwich. The present claim of invention therefore consists merely in the employment of steam *generated in this particular manner* to the purposes stated, or any other purpose to which steam so produced may be employed.

Inrolled, December, 1824.

To James Viney, *of Shankling in the Isle of Wight, Colonel in the Royal Artillery, for his New Invented Method of supplying Water or Fluids for Domestic or other Purposes, in a manner more extensively and economically than has hitherto been usually practised.*

[Sealed 22nd May, 1824.]

The patentee states, that in carrying his invention into effect, he avails himself of the rain water that falls, or he employs water raised by force pumps or other means, and particularly what is called the high service supply furnished to the tops of houses in large towns by the water companies. This water he conducts down pipes from the gutters of the houses, or other sources of supply, into cisterns upon the several stories of the house, and when these cisterns are filled to a certain height, he allows the surplus water to run off by waste pipes into the sewers or other drains: the water being retained in the cisterns for the use of water-closets, baths, or other domestic purposes. In order to conduct the water from the perpendicular pipe by lateral channels into the cisterns, stops (we suppose stop-cocks) are to be inserted in the pipe, at such places, so as to stop its descent, and turn its course sideways.

In cases of violent rain, or sudden thaw, the water might flow too rapidly for the waste pipe to discharge it, and thereby run over the cisterns into the apartments of the house; to obviate this inconvenience a semi-circular or otherwise curved tube is introduced in the side of the main pipe, which is intended to open a communication from the upper to the lower part of the pipe, past

the stop-cock, so that in the event of the lateral tube leading to the cistern, and its waste pipe not being sufficient to carry off the water, it might escape by this semicircular tube immediately down to the sewer.

This contrivance the patentee thinks is particularly applicable to gentlemen's seats, and further states that it is attended with very great economy. This does not appear to be very comprehensible; neither would the particular features of the invention itself have been easily discovered, if the inventor had not favoured us with his specific claims, by which we perceive that carrying away the water by a waste pipe from one reservoir to another, is not to be considered as new; "but" he says, "I do claim the arrangement of the circular pipe for carrying off any sudden rush of water, without which the rain water could not be conveyed into the several reservoirs, without subjecting the apartments to be overflowed with water, and which could not be effected without the circular pipe with safety."

Here we presume the specification of this invention should have ended, but we further read: "My method of supplying hot air for heating rooms, is by a portable cylinder of iron, or other suitable material, cast with two pipes and two legs," &c. As there is no mention of supplying hot air in the title of the patent, this appears to have the character of a distinct invention, unless hot air is to be considered as one of the fluids for domestic or other purposes contemplated. That our readers may not, however, lose the benefit of this invention we will describe it.

An iron tube or box is placed at the bottom of an ordinary fire grate, from which extends two pipes, the one to receive cold air at the lower part of the room, and conduct it into the box or tube, where becoming heated

and rarified, it escapes through the other pipe, and discharges itself at the upper part of the room, thereby filling the apartment with heated air.

[*Inrolled*, *November*, 1824.]

This is one of the oldest modes of constructing calorific stoves; but as the air becomes burned in its passage, and therefore unfit for respiration, the tube (or worm pipe as is usually employed) had better be immersed in a vessel of steam.

EDITOR.

To ROBERT GARBUTT, *of the Town of Kingston-upon-Hull, Merchant, for his Invention of an Apparatus for the more convenient Filing of Papers, and other Articles, and Protecting the same from Dust or Damage; including Improvements on or additions to the Files in common use.*

[Sealed 15th June, 1824.]

THE patentee commences his specification by describing the files in common use for securing letters and other papers, particularly those files consisting of a slip of wood, to lay at the back edge of the sheets, with two strings passing through the papers, to be tied in front. By his improvement however one string only is sufficient to confine the paper by the assistance of the newly constructed apparatus.

Plate XV. fig. 2, is a flat view of the apparatus, consisting of a square board, *a a*, upon which is laid a square

frame, *b b*, with a rebate on the inside, for the frame, *c c*, to slide in, and a pasteboard is to be laid over the whole as a flat cover. An edge view of this apparatus, with the papers secured in it, is shewn at fig. 3, the leaves or sheets being open; and a similar view is shewn at fig. 4, the leaves or sheets being closed.

The back edges of the sheets of paper are held between two semi-cylindrical rules or rods, *d* and *e*, and a string fastened to the lower rod passes through the papers, and through the upper rod, which is to be made fast round a knob on the outside. When a paper is to be introduced the string is withdrawn from the upper rod, which is to be raised, and after filing the paper, the string is again passed through the upper rod and drawn tight. The sheets are then turned over, as seen in fig. 4.

The upper rod, *e*, is attached to the arms, *f f*, extending from an axle, *g*, affixed to the sliding frame, *c*, and may thereby be raised, turning upon its pivots. When the leaves are opening the sliding frame, *c*, moves to the left, and when they are closing it slides to the right; *h*, is a small point for pricking a hole in the edge of the paper previously to filing it. By laying the papers separately against the edge of the frame, *b*, the hole will be made in each in that exact spot which shall enable them all to be filed with their edges even.

There are several other contrivances applicable to the rules or rods, *e* and *d*, for confining the back edges of the paper, one of which is shewn at fig. 5. In this the upper rule rises and falls by jointed arms, *a a*, having studs at their upper ends, moving in long grooves or slots and by end rods sliding in sockets, *b b*. Other kinds of jointed rods are also proposed to confine the back edges of the papers, such as parallel rule joints, by which the rods or rules are opened and closed; but the leading fea-

tures of the invention are the board and frames above described, to which may be added an additional board to be attached to the rule, *e*, for the purpose of unclosing the leaves as a book. In order to allow of any of the papers being removed from the file without disturbing the whole, a jointed tag, as shewn at fig. 6, is to be attached to the string, which when passed through the papers may be unscrewed, and one of the sheets removed, the string being drawn through again, the rule is to be made fast as before.

[*Inrolled, December*, 1825.]

To WILLIAM HENRY JAMES, *of Cobourg Place, Winson Green, near Birmingham, in the County of Warwick, Engineer, for his Invention of certain Improvements on Railways, and in the Construction of Carriages, to be employed thereon.*

[Sealed 5th March, 1825.]

THESE improvements on railways, and in the construction of carriages to be employed thereon, consists, in the first place, in forming the rails at those parts of the road where curves or turns are to be made, with ribs of different elevations, and adapting grooves of different diameters, on the peripheries of the carriage wheels, to run upon these rails, so as to cause the two opposite wheels on the same axle of the carriage to vary in their circumferences, at those parts of the rail road or railway where the carriage has to turn, and consequently to run in curves

instead of straight lines. The second feature of the invention is the adaptation of rotatory shafts, with a peculiar kind of gear, to railway carriages, for the purpose of actuating the several wheels upon which the said carriage runs; and, lastly, the employment of a peculiar kind of universal joint, for connecting the rotatory action of one shaft with the next shaft, so as to communicate from a steam engine, or other moving agent, rotatory power to the wheels of all the carriages that may be connected together on the line of railway.

Plate XV. fig. 7, represents the section of a rail, with an elevation, *a*, in the middle, for the periphery of the wheel (also shewn in section) to run upon. If the diameter of the two opposite wheels of a carriage were the same, then the carriage would move forward in a straight line, but if the diameter of one of the wheels be increased, then the carriage must move forward in a curved line, because the circumference of the two wheels is not equal. It is therefore proposed to make the peripheries of the wheels of these carriages variable in their circumferences, by means of grooves, or what may be called steps, as shewn in the section at *b*, *c*, *d*. If the surface of the rails be so constructed in those parts of the line of road, where the turns are to be made, as to allow of bringing the larger diameter of the wheels on one side of the carriage into action, the carriage will then move in a curve, proportionate to the difference of circumference between the two wheels on the same axle. Let it be supposed that it is desired to turn the carriage to the left, in a curve that shall increase on the outer line one inch in a yard, it would then be necessary to introduce in the right hand line, a rail, the section of which is shewn at fig. 8, having its rib, as at *e*, on the side, when by bringing the larger circumference of the wheel, as the step, *b*,

into contact with the rail, the carriage would move forward in the above curve inclining to the left, because the circumference of the right hand wheel is so much greater than that of the left hand wheel.

Any other quantity of curve may be given to the progress of the carriage, by varying the diameters of the wheels, as at fig. 9, where by bringing the step, *d*, of the right hand wheel, into contact with the right hand rail, at *f*, the curve would incline to the left, in the proportion of two-thirds of an inch in a yard increase on the right hand rail. Another variation of this contrivance is given at fig. 10, where the steps, *a* and *b*, of the respective wheels are brought into contact with the rails, at *e e*, and produce a curve to the left, increasing on the right hand rail one-third of an inch in a yard.

It must be obvious that this simple mode of forming the rails and the peripheries of the wheels, with several elevations, may be varied so as to cause the carriages to run in any curve either to the right or to the left, which contrivance will prevent the drag and friction that always takes place when carriages of the ordinary construction are made to run in curved directions.

Fig. 11, exhibits two carriages connected together upon a railway, in which *a*, *a*, *a*, are the rotatory shafts for impelling the carriages to be put in motion by the power of a steam engine, or other agent, communicated to the toothed wheel, *b*, or otherwise; which rotatory shafts actuate bevel gear enclosed in the boxes, *c*, *c*, and the universal joints, *d*, *d*, link the ends of the shafts together, and cause them all to turn simultaneously.

Fig. 12, is an enlarged view of the box, in which the bevel gear is placed for actuating the running wheels of the carriages, the side of the box being removed to shew the interior; and fig. 13, is a plan or horizontal view of

the same; *a*, *a*, is the rotatory shaft; *b*, a bevel pinon upon that shaft, taking into a bevel toothed wheel, *c*, which turns horizontally in cross bearings. There is an upper and under rim of bevel teeth on the wheel, *c*, and the under rim takes into the toothed wheel, *d*, affixed to the axle of the running wheel. Thus it will be perceived the rotation of the shaft, *a*, actuates the horizontal wheel, *c*, and that turning the wheel, *d*, gives rotation to the running wheel, upon which the carriage is propelled forward.

Figs. 14 and 15 are two different views of the universal joint, by which it is proposed to connect the rotatory shafts together; *a*, *a*, are the extremities of the rotatory shafts, one of which has a crescent formed arm, *b b*, that receives the pivots, *c*, *c*, of the box joint; *d*, *d*, are two arms opening and shutting upon an axle joint, in the centre of the box; and at the extremities of these are links or any other suitable contrivance for uniting them with other similar arms, *e*, *e*, moving upon an axle joint in the box, *f*, at the extremity of the next rotatory shaft. By means of these universal joints, the whole line of shafts are connected under the several carriages in train upon the line of rails, and supposing the shafts should get into oblique position to each other, as they would do at the turns of the road, then by means of these universal joints the rotatory action of the shafts are continued through the whole line of the carriages.

The patentee says, "I have herein described certain mechanical contrivances, for which I do not mean to claim the exclusive use, excepting as they may be adapted to railways, and carriages to be employed thereon, in the manner above described. In order, therefore, to be more explicit, I wish it to be understood, that my claim of invention consists, 1st, in the employment of

wheels, the peripheries of which are formed with grooves and steps of several elevations, and also in the employment of rails corresponding thereto, as above described, when such carriage wheels are actuated by rotatory shafts; 2ndly, in the adaptation to railway carriages of a peculiar kind of bevel gear, to be actuated by a rotatory shaft for the purpose of turning the wheels of the carriages, and thereby propelling them upon the line of rails; 3rdly, in the employment of universal joints as above described, for connecting and communicating rotatory motion, to a series of shafts, which occasionally form angles with each other as the carriages move along curves in the line of railway."

[*Inrolled, September*, 1825.]

To Aaron Jennings *and* John Belteridge, *both of Birmingham in the County of Warwick, Manufacturers and Japanners, for their Invention of certain Improvements in the Method or Methods of Preparing and Working Pearl-shell into various Forms and Devices, for the Purpose of Applying it to Ornamental Uses in the Manufacture of Japan Ware, and of other Wares and Articles to which the same can be applied.*

[Sealed 29th March, 1825.]

These improvements consist in cutting the pearl-shell into very thin veneers, and forming these veneers into ornamental pieces by similar means to etching on metal, and biting by a strong acid. The patentees propose to

cut the pearl-shell into thin slabs or plates, of about the fortieth part of an inch, or from that to the hundreth part of an inch in thickness: upon these plates the subjects or devices to be cut out are to be first drawn or painted with a solution of asphaltum made in spirits of turpentine. Resin dissolved in the same menstrum, wax, varnish or any other material capable of resisting the action of acid, would answer the purpose.

When the coatings of varnish, or devices thus made by a camel's hair pencil, have become thoroughly dry, the face of the plate is to be brushed over repeatedly with strong nitrous acid, or other proper acids, until by the acids eating away the parts of the sheet not covered or protected by the varnish, the figures or devices previously drawn or painted, stand up above the surface of the plate. The varnish is now to be washed off by spirits of turpentine, or other proper solvent, and the ornamental sprigs, figures, or other device, formed in relief are fit for use.

When it is desired to cover the whole surface of the shell with devices, an etching ground is to be laid all over the face of the slab, made of the same sort of varnish as is usually employed in etching metal plates, and when the forms or devices have been drawn by a steel point, acid is to be put upon it, and all those parts which have been drawn will be bit in in lines, while those parts protected by the varnish will remain.

In making ornaments upon thick pieces of shell, where the figures are intended to stand in bold relief, a similar process of biting away the ground is to be adopted, after which, the prominent parts are to be cut or carved by a sharp tool.

Those ornaments formed as above described, upon thin sheets or plates of shell, may be cut out by a sharp knife, by placing the plate upon a flat surface. When a con-

siderable quantity of these ornaments are required to be all exactly alike, any number of the thin slabs of shell may be attached together by glue or otherwise, and after the forms have been etched and bit in on the external slab, the whole may be cut out at once by a saw, the slabs being confined in a vice, and when this is done the pieces may be separated by soaking them in warm water.

[*Inrolled, October*, 1825.]

To Thomas Attwood, *of Birmingham, in the County of Warwick, Manufacturer, for his Invention, and having brought to perfection an Improved Method of making a Nib or Nibs, Slot or Slots, in Copper Cylinders, or Cylinders of other Metal used for Printing Cottons, Linens, Silks, Stuffs, and other articles.*

[Sealed 26th February, 1825.]

In the improved modes of printing silks, calico, and other fabrics; cylinders of copper have, of late years, been employed, in place of flat plates or wooden blocks; upon the surfaces of these cylinders, the subjects to be printed have been engraved, and on the pattern becoming old fashioned, the surface has been turned away, and a new pattern engraved. This necessarily reduced the diameter of the cylinders, and rendered their adaptation to the printing machinery inconvenient, in consequence of not being all of one size, and the appropriation of an entirely new cylinder to every newly engraved subject being an expensive matter, induced the present patentee to introduce a mode of soldering cylindrical shells of

copper upon rollers of iron or steel, and to displace those copper shells, and solder on new ones as often as the subjects required to be changed. For this practice, the inventor obtained a patent in June, 1823, (see our Seventh Vol. page 285.)

The present invention is a further improvement in the construction of printing cylinders, to be made of copper, or other suitable metal, which consists in making hollow cylinders for the purpose of introducing an iron or steel axle; these are to be held together by means of nibs, or protuberent pieces falling into slots or recesses.

The iron or steel axle is first to be prepared, as shewn in Plate XV. at Fig. 16, by turning it in a lathe. At each end of the axle, the shoulders and recesses, *a a*, are formed, upon which it is to revolve in the printing machine, and the middle part of the axle is made nearly cylindrical, very slightly tapering towards one end. A rising piece is to be left at the larger end, for the purpose of forming the nibs or protuberent pieces, *b b*, which are to be cut or filed out of the solid to their shape. At the reverse end of the axle, the recesses, *c c*, are to be made by cutting away the metal; and when this is done, the axle may be considered as complete.

The hollow cylinder shewn, detached at fig. 17, is to be made from an ingot of copper turned in a lathe, on the outside to a smooth, and perfectly cylindrical periphery; it is then to be bored on the inside in the following manner. First, make a hole entirely through it; and then, with another tool something larger, bore it again within about two inches of the end, leaving a ledge out of which the nibs, *d d*, are to be formed, as seen in the end view, fig. 18. These nibs are intended to fit into the slots or recesses, *c c*, of the axle. At the reverse end of the hollow cylinder, the internal slots or recesses, *e e*, are formed by

cutting away the metal, as shewn in the end view, fig. 19; which slots are intended to receive the nibs or protubent pieces, *b b*, on the axle. The hollow cylinder is to be properly hammered or drawn through a hole, in a steel draw-plate, by which the copper will become elongated upon the axle, and adhere to it with firmness.

The advantages of these improved rollers or cylinders for printing, are, that many copper cylinders may be fitted and adapted to one iron or steel axle, and shifted at pleasure, which will save a very great expense in the cost of printing cylinders; and when the engraved subjects require to be changed, another cylinder may be put upon the axle, and made fast by drawing through a steel hole, as above mentioned; which improvements are said to produce stronger rollers than those made of solid copper, and less expensive, which is a great object, as the same copper is not applicable to printing rollers after having been re-melted.

The patentee concludes by saying, though I have shewn in the drawing, three nibs and three slots in each cylinder and axle, I do not mean to confine myself to that number, as one or two may be sufficient under some circumstances, or three, four, or any other number may occasionally be found desirable; neither do I mean to confine myself to any particular dimensions, as that will depend upon the goods to be printed.

[*Inrolled, August* 1825.]

Original Communications.

To the Editor of the London Journal of Arts.

Sir,

Perceiving in a recent number of your Journal, that you have mentioned my inventions relative to rail roads and steam carriages, and thinking that you might intend shortly to introduce the specification of my last improvements upon those subjects, (see page 301, of the present number), I have taken the liberty of forwarding to you a statement of the results of some trials lately made at Birmingham, with models of my carriages and rails, constructed upon a scale of nearly half their intended size. The principal object of these experiments was, to prove that the friction of the peripheries of the wheels, against the rails, was sufficient to allow of the carriages ascending hills, or inclined planes of considerable elevation; knowing that it is generally believed carriages cannot be propelled by any locomotive force up an inclined plane, which rises more than an elevation of about twenty feet in the length of a mile.

A rail road was, therefore, laid down, of rather more than a hundred feet in length, made by means of timbers, and the track of the carriage wheels covered with bright plate iron. One-third of the line of rails run perfectly horizontal, the remaining part formed two inclined plains,

the first rising one inch and a half in the yard, and the second three inches in the yard.

Two carriages, connected together by means of the rods and universal joints, were placed upon this railway, each running upon four cast iron wheels of about twenty inches diameter. A rotatory motion being given to the longitudinal shaft of the front carriage, (see the specification, and Plate XV.) all the wheels of both carriages were actuated simultaneously; and it was proved to the many spectators present, that the carriages ascended both inclined planes with a regular progressive motion and without slipping back in the slightest degree.

In descending the same inclinations, the wheels of the carriages were occasionally locked, by stopping the rotation of the longitudinal shafts, for the purpose of ascertaining whether the carriages would slide; but no such thing occurred, even though suddenly checked in their progress when moving with considerable velocity.

It will hence be perceived, that by my method of actuating the several wheels of all the carriages in train, by the rotatory shafts and bevel gear, that I have a perfect command over their progress, and can at pleasure accelerate or retard their motion, as well upon the inclined parts of the road as upon a perfect level.

By experiments I have subsequently proved a fact, which I had previously anticipated, viz. that a carriage or train of carriages upon a rail road, may be made to ascend by means of locomotion, (the power being applied to all the wheels) up any inclination upon which it would not slide, by the power of gravitation, when all the wheels were locked.

In order to prove the advantages of my plan of forming the rails at the turns of the road, with several differ-

ent elevations, and the peripheries of the wheels of variable diameters, to prevent the excessive friction by their rubbing against the rails, I constructed a portion of a rail way, part of which was straight, and other parts deviating from a right line, in curves of one inch in a yard, and one inch and a half in a yard. The wheels were fixed upon their axle, and being impelled forward, the different diameters of their peripheries came into contact with the different elevations of the rail, at the winding parts, running over the curves without any perceptible increase of friction, and without the slightest concussion or jolting.

These experiments have been performed in the presence of a very great number of persons, among whom might be named several eminent scientific characters, and I believe with universal satisfaction. I have not leisure at present to particularize the savings, and other advantages, which I think must arise from the employment of these improvements in rail roads, and locomotive carriages, generally; but considering that at the present time (the scientific world being alive to every thing connected with the subject of rail roads and steam carriages) the above plain statement of facts, arising out of actual experiments, might not be unacceptable to the readers of your interesting publication, I take the liberty of presenting them, and subscribing myself

Yours, &c.

W. H. James

Winson Green, Birmingham.

To the Editor of the London Journal of Arts, &c.

SIR,

THE pages of your interesting Journal being particularly devoted to mechanical subjects, I am induced to request your insertion of the following comments upon the new Act of Parliament, for "ascertaining and establishing Uniformity of Weights and Measures," the principles of which are founded in mechanical science. I have, for some time, expected to have seen your remarks, or those of some of your correspondents, upon this new act, but in the absence of a more able writer, I beg to offer a few observations, with the view of drawing forth such replies or explanations, as may satisfy myself and the rest of the community, that the alterations in our system of weights and measures, which are to take place on the 1st of January, are founded upon such simple and elementary principles of science and general public utility, as to justify the very great trouble, expense, and temporary inconvenience which must attend their introduction.

The public importance of the subject will, I think, justify me in occupying several of your pages with quotations from the Act itself. I shall, therefore, commence with the first paragraph:—

I. "Whereas it is necessary for the security of commerce, and for the good of the community, that weights and measures should be just and uniform: and whereas notwithstanding it is provided by the great charter, that there shall be but one measure and one weight throughout the realm, and by the treaty of union between England

and Scotland, that the same weights and measures should be used throughout Great Britain as were then established in England, yet different weights and measures, some larger, and some less, are still in use in various places throughout the United Kingdom of Great Britain and Ireland, and the true measure of the present standards is not verily known, which is the cause of great confusion and of manifest frauds: for the remedy and prevention of these evils for the future, and to the end that certain standards of weights and measures should be established throughout the United Kingdom of Great Britain and Ireland; be it therefore enacted by the king's most excellent majesty, by and with the advice and consent of the lords spiritual and temporal, and commons, in this present parliament assembled, and by the authority of the same, that from and after the 1st of January, 1826, the straight line or distance between the centres of the two points in the gold studs in the straight brass rod, now in the custody of the clerk of the House of Commons, whereon the words and figures "Standard Yard, 1760," are engraved, shall be and the same is hereby declared to be the original and genuine standard of that measure of length or lineal extension called a yard; and that the same straight line or distance between the centres of the said two points in the said golds tuds in the said brass rod, the brass being at the temperature of sixty-two degrees by Fahrenheit's Thermometer, shall be and is hereby denominated the "imperial standard yard," and shall be and is hereby declared to be the "Unit" or only standard measure of extension, wherefrom or whereby all other measures of extension whatsoever, whether the same be lineal, superficial, or solid, shall be derived, computed, and ascertained; and that all measures of length shall be taken in parts or multiples, or certain proportions of the

said standard yard; and that one-third part of the said standard yard shall be a foot, and the twelfth part of such foot shall be an inch; and that the pole or perch in length shall contain five such yards and a half, the furlong 220 such yards, and the mile 1760 such yards.

II. "And be it further enacted, that all superficial measure shall be computed and ascertained by the said standard yard, or by certain parts, multiples, or proportions thereof; and that the rood of land shall contain 1210 square yards, according to the said standard yard; and that the acre of land shall contain 4840 such square yards, being 160 square perches, poles, or rods.

III. "And whereas it is expedient that the said standard yard, if lost, destroyed, defaced, or otherwise injured, should be restored of the same length, by reference to some invariable natural standard: and whereas it has been ascertained by the commissioners appointed by his majesty to inquire into the subject of weights and measures, that the said yard hereby declared to be the imperial standard yard, when compared with a pendulum vibrating seconds of mean time in the latitude of London, in a vacuum at the level of the sea, is in the proportion of thirty-six inches to thirty-nine inches, and 1393 ten-thousandth parts of an inch; be it further enacted and declared, that if at any time hereafter the said imperial standard yard shall be lost, or shall be in any manner destroyed, defaced, or otherwise injured, it shall and may be restored by making, under the direction of the lord high treasurer, or the commissioners of his majesty's treasury of the United Kingdom of Great Britain and Ireland, or any three of them, for the time being, a new standard yard, bearing the same proportion to such pendulum as aforesaid, as the said imperial standard yard bears to such pendulum."

The standard yard therefore remains as heretofore, thirty-six inches; and we are referred in case of losing or damaging this standard, to the length of *a pendulum vibrating seconds at London*, which is declared to measure 39.1393 of these inches or thirty-sixth parts of the yard. This is undoubtedly the best refernce that can be devised, because the *length* of a pendulum vibrating seconds at London, can never vary while the matter forming the globe of the earth retains its present figure, and the velocity with which it revolves upon its axis, continues the same as at the present time, neither of which are likely to become altered; but why not at once make this length of the pendulum the *unit* for all measures of extension? This with *decimal* division would be as complete as could be wished.

The measure of weight, which is the next branch of the act, seems to be quite as confused as hitherto, and with what intention it has been altered, I cannot imagine.

IV. " And be it further enacted, that from and after the 1st of January, 1826, the standard brass weight of one pound of troy weight, made in the year 1758, now in the custody of the clerk of the House of Commons, shall be and the same is hereby declared to be the original and genuine standard measure of weight, and that such brass weight shall be and is hereby denominated the imperial standard troy pound, and shall be and the same is hereby declared to be the unit or only standard measure of weight, from which all other weights shall be derived, computed, and ascertained; and that one-twelfth part of the said troy pound shall be an ounce; and that one-twentieth part of such ounce shall be a pennyweight; and that one-twenty-fourth part of such pennyweight shall be a grain; so that 5760 such grains shall be a troy pound, and that 7000 such grains shall be and they are hereby

declared to be a pound avoirdupois, and that one-sixteenth part of the said pound avoirdupois shall be an ounce avoirdupois, and that one-sixteenth part of such ounce shall be a dram.

V. "And whereas it is expedient, that the said standard troy pound, if lost, destroyed, defaced, or otherwise injured, should be restored of the same weight, by reference to some invariable natural standard: and whereas it has been ascertained, by the commissioners appointed by his majesty to inquire into the subjects of weights and measures, that a cubic inch of distilled water, weighed in air by brass weights, at the temperature of sixty-two degrees of Fahrenheit's thermometer, the barometer being at thirty inches, is equal to 252 grains and 458 thousandth parts of a grain, of which, as aforesaid, the imperial standard troy pound contains 5760; be it therefore enacted, that if at any time hereafter the said imperial standard troy pound shall be lost, or shall be in any manner destroyed, defaced, or otherwise injured, it shall and may be restored by making, under the directions of the lord high treasurer, or the commissioners of his majesty's treasury of the United Kingdom of Great Britain and Ireland, or any three of them for the time being, a new standard troy pound, bearing the same proportion to the weight of a cubic inch of distilled water, as the said standard pound hereby established bears to such cubic inch of water."

Thus there are still two different pound weights, of which the troy is not altered, being 5760 grains. But the pound avoirdupoise is declared to contain 7000 grains troy, (formerly 7004) which makes the ounce to differ also; for 16 ounces troy would contain 7680 grains. If we must have two different pound weights, although obviously there can be no cause for it, why not let the ounce be the same? We should then have a much readier means of

comparing the one with the other. But decidedly there is no occasion for, and there should not be two different weights.

The reference in case of loss is the weight of a cubic inch of water, which is declared to be 25,458 grains. Why not make this the *unit* for the measures of weights? We will now consider the measures of capacity;—

"VI. And be it further enacted, that from and after the 1st of January, 1826, the standard measure of capacity, as well for liquids as for dry goods not measured by heaped measure, shall be the gallon, containing ten pounds avoirdupoise weight of distilled water weighed in air, at the temperature of sixty-two degrees of Fahrenheit's thermometer, the barometer being at thirty inches; and that a measure shall be forthwith made of brass, of such contents as aforesaid, under the directions of the Lord High Treasurer, or the commissioners of his majesty's treasury of the United Kingdom, or any three or more of them for the time being; and such brass measure shall be and is hereby declared to be the imperial standard gallon, and shall be and is hereby declared to be the unit and only standard measure of capacity, from which all other measures of capacity to be used, as well for wine, beer, ale, spirits, and all sorts of liquids, as for dry goods not measured by heap measure, shall be derived, computed, and ascertained; and that all measures shall be taken in parts or multiples, or certain proportions of the said imperial standard gallon; and that the quart shall be the fourth part of such standard gallon, and the pint shall be one-eighth of such standard gallon, and that two such gallons shall be a peck, and eight such gallons shall be a bushel, and eight such bushels a quarter of corn or other dry goods, not measured by heaped measure."

VII. "And be it further enacted, that the standard measure of capacity for coals, culm, lime, fish, potatoes, or fruit, and all other goods and things commonly sold by heaped measure, shall be the aforesaid bushel, containing eighty pounds avoirdupois of water as aforesaid, the same being made round with a plain and even bottom, and being nineteen inches and a half from outside to outside of such standard measure as aforesaid.

VIII. "And be it further enacted, that in making use of such bushel, all coals and other goods and things commonly sold by heaped measure, shall be duly heaped up in such bushel, in the form of a cone, such cone to be of the height of at least six inches, and the outside of the bushel to be the extremity of the base of such cone; and that three bushels shall be a sack, and that twelve such sacks shall be a chaldron."

The only material difference created by this new act seems to be in the measure of capacity; the gallon is to contain 10 *lbs.* AVOIRDUPOIS of water (the TROY is stated to be the *standard* lb.)—is it not then very absurd to calculate the other measures by AVOIRDUPOIS? This is equal to 277,27 *inches* of water—the old gallon contained but 231 inches. The only advantage of this seems to be that we get an even number of lbs. of water for the gallon; but if this was the object of the alteration, why not make the gallon 8 lbs.? we should then have had the pint 1 lb. or unity.

I have but a faint remembrance of what passed in the Commons at the time this act was under consideration, and therefore do not know what good the intelligent parent (Sir W. de Crespigny, I believe) intended; but it seems to me that there will be quite as much confusion now as hitherto; and I cannot conceive why, when they once resolved upon an alteration they did not adopt the *decimal* system.

That absurd practice of *heap measure* is still to be kept up, when there can be no reason in its favour; the buyer must always be at the mercy of the seller, for, although the act obliges the cone to be piled to the height of six inches, yet this by no means fixes the value of the measure, which must always depend upon the eye of the buyer or seller, who will, of course, see very differently.

In a paper, by Mr. Renardson, in the Philosophical Transactions, he says that the avoirdupoise lb. was the only weight till the troy was introduced by Henry VII. and silk, jewels, gold, silver, and all liquids weighed by it. He derives it from Troye, a town in France, where a celebrated fair was held. The yard measure was introced by Henry I. and taken from the length of his own arm.

In the closing of the act, there is a long catalogue of old acts of parliament relating to local and customary weights and measures, which are hereby repealed; but if from the recital of these, the necessity of one universal standard is to be argued, there is obviously as great a necessity that the standard itself, and all its divisions, should be not only undeviating but also primitively simple.

I am, Sir,

Your's, &c.

MENSURO.

Novel Inventions.

A new and simple Cooler for the use of Brewers, by Baron Luttwitz, of Silicia.

THE ordinary brewers' cooler is constructed in such a manner, that the beer may spread over a large surface, to come in contact with a large portion of cold air; and it is often necessary to increase this contact, by stirring the beer with a large spatula or other mechanical means. The following cooler is invented by Baron Luttwitz, of Silicia, and is constructed on this theory, that a heated body becomes cool more quickly when immersed in water than in air. It is composed of three vases: the 1st, is a large one, and of wood; 2nd, one of copper, in the form of a caldron, contained in the preceding vase; 3rd, another of copper, similar to the preceding, but smaller and fixed in the middle of the two.

The two last vases ought to be made of sheet copper, and as thin as possible, and every one must be provided with three feet, or supports to the height of six inches, serving to attach the vases, one inside the other. The largest copper vase must be four feet high, and as much in diameter. The next, smaller, must be three feet nine inches high, and three feet in diameter, so that when placed in the other, there will be a space equal to six inches all round it. Into the middle of the smallest vase a current of cold water must pass, and which current must be so contrived as to pass equally round the interior of the wooden vase; at the same time the beer contained in the

two vases must be circulated to render it fit for the fermenting vase. A person can cool by means of this apparatus six times as much wort in an hour and a half to the temperature of 24° fit for fermention, whilst with the ordinary cooler, it requires a surface of 256 feet, and occupies twelve hours to produce the same effect, proving the great utility of this apparatus.

A new invented Silk Loom.

A new constructed loom has lately been introduced at Lyons, for weaving of silk, which is said to possess many advantages over the Lyons looms heretofore used. The mechanism is extremely simple, and allows one man to weave five pieces at the same time. The commissioners of the academy at Lyons have examined the loom, in company with M. Jacquart, the inventor of the Lyons loom, now used in England. M. Jacquart is of opinion that this new invention is of great moment; he has also improved upon it. The inventor is M. Lebrun, and the academy are about to confer a gold medal on him for the invention. By this loom a saving of four-fifths will be made in the expense of labour.—*Courier Français.*

Steam Engine.

We have lately noticed (says the *Liverpool Courier*) a newly-invented steam engine, a patent for which has been obtained by Mr. Eve, in the United States. We have since had an opportunity of witnessing the operations of

a model, which Mr. Eve has constructed for the purpose of elucidating the principle of his invention. Mechanism is a subject of such importance, and the inventions and theories of the present day are so numerous, that we approach such subjects witb diffidence. We will, however, endeavour to explain the construction of this engine; and the first thing deserving notice is the simplicity of the motion, which is rotatory. It consists of but two moving parts, both of which revolve, and are similar to each other, and a steam generator. It has no parts in common with the steam engines in use. No cylinder, piston, valve, cock, fly wheel, crank, condenser, or any reciprocating parts whatever. It is impelled by the direct impulse of the steam acting on surfaces at right angles with the motion, so as to appropriate its whole power under the most favourable circumstances.—There is the least possible friction, as there are no parts that rub or touch but the pivots. Its velocity is unlimited, so that, with the smallest conceivable force acting, the greatest power required can be obtained, by which means an engine of a very small size may be made to perform almost any given quantity of work.

We presume that this new and very wonderful invention, which appears so much to delight the Editor of the *Liverpool Courier*, is something like the " first steam engine," as Mr. Partington calls it, which has been exhibited in all the two-penny periodicals of the day, under the similitude of a man's head at the top of a boiler, blowing steam against the flaps of a radiating paddle wheel.

On the Construction of Chimneys.

Mr. Tredgold, in his work on warming and ventilating apartments, has given the following rule for proportioning the upper orifices of chimneys to their heights, and the magnitude of the fire-places:—

Multiply by 17 the length of the fire-place in inches. Divide the product by the square root of the height in feet, and the chimney above the fire. The quotient will be the area of the upper orifice in square inches.

Thus, if the fire is 15 inches wide, and the height of the chimney be 9 feet, we shall have $\frac{17 \times 15}{7} = 36\frac{1}{2}$ square inches nearly, which is a rectangle of 6×6 inches, in a circle of nearly 7 inches in diameter. In chimneys already existing, the upper orifices may be contracted to their proper size by Parker's cement. The contraction of the lower end of the vent above the fire should be nearly the same as the upper orifice; and the throat or lowest opening should not exceed the length of the bars. The length of the front of the fire should be an inch for every foot of the room's length, and the depth one-half the length. If the length of the chamber should be such as to require a grate more than 30 inches long, two fire-places should be constructed.

M. Ventau's Gigantic Meteorological Eolian Harp.

Captain Haas, of Basle, has designated by these names, an apparatus which emits of itself a variety of sounds

during a change of weather. Since the year 1787, he had stretched above his garden *fifteen* iron wires, 320 feet long, and at the distance of about two inches from one another; the largest wire two lines in diameter, the smallest one line, and those of an intermediate size one and a half line. They were situated towards the south, and are inclined 20° or 30° to the horizon, being stretched by means of rollers properly arranged for the purpose. Whenever the weather changes, these wires sound with such loudness, that it is impossible to go on with a concert in the house. The sounds sometimes resembled the hissing noise of water rapid in ebullition, sometimes that of a harmonicon, and sometimes that of a distant chime, or an organ.

The inventor of this curious apparatus is M. Ventau, provost at Burkli, not far from Basle. He sometimes shot at a mark from his window; and in order that he might not go to the mark after each shot, he attached to it a long iron wire to draw it to him at pleasure. He remarked more than once, that that wire sounded exactly an octave; and he found that every iron wire, stretched in a direction parallel to the sounds, emitted this tone at every change of weather.

A brass wire did not produce any sound, nor did an iron wire, when it was stretched from east to west.

M. Dobereiner, of Jena, conceives that the phenomenon now described is the effect of an electro-magnetic action; and he proposes to try if the brass wire would not sound when it communicates at its extremity with an energetic electrometer. *Bullet. des Sc. Techn.* &c.

Polytechnic and Scientific Intelligence.

ASTRONOMICAL SOCIETY OF LONDON.

11th November, 1825.

THE Society resumed its sittings this evening, and the President took the opportunity of calling the attention of the members to the remarkable circumstance of the appearance of no less than *four* comets during the recess, an occurrence unparalleled in the history of astronomy. The *first* of these (he observed) was discovered by M. Gambart, at Marseilles, on May 19, in the head of *Cassiopea*. The *second* by M. Valz, at Nismes, on July 13 near χ *Tauri*. The *third* by M. Pons, at Florence, on Aug. 9, in *Auriga*. The *fourth* (which was the most interesting and important of the whole, since it had been the object of solicitude at every observatory, and was anxiously expected and looked after by every astronomer) was discovered about July or August last. The President remarked that this last comet (which is better known by the name of the *comet of Encke*) has now made 13 revolutions within the last 40 years: six of which have been regularly observed by astronomers. It was first seen in 1786; afterwards in 1795, 1805, 1819, 1822, and in the present year. It makes a complete revolution in about 1207 days, or about 3½ years.

A paper was read on the latitude of the Royal Observatory of Greenwich, by the Astronomer Royal. The co-latitude of this observatory, as computed from Dr. Bradley's observations under the direction of Dr. Maske-

lyne, is 38° 31′ 22″, 0; a determination which is subject to the sum or the difference of two separate errors: one in determining the zenith distance of *γ Draconis;* the other, in the measure of the distance of that star from the pole.

After the new mural circle was erected in 1812, another attempt was made to determine this important element. The result was 38° 31′ 21″, 5; a result, however, in which it was thought probable than an error of half a second might exist.

In the year 1822 a new method of observing was introduced at Greenwich, by means of the *reflected* images of stars from an artificial horizon. To apply this to the determination of the element in question, by comparing two catalogues, one formed by direct vision, the other by reflection, that co-latitude being assumed to be the true one, which made the sum of the small positive and negative differences equal to zero, and that was found to be 38° 31′ 21″, differing by *one second* from the determination furnished by Bradley's observations. This result, however, may involve an error of from a quarter to half a second, which subsequent observations may diminish.

The same paper includes some remarks on observations upon the polar-star, and an interesting circumstance, which is this:—The undulation to which a mass of mercury is liable, even with the greatest care, is, in itself considered, unfavourable to the exact bisection of an image; but a circumstance occurs in the formation of the image in the telescope, which in some measure compensates the inconvenience. The vibrations of the mercury in a longitudinal trough occasion an elongated image of the star in the direction of the wire, appearing like a succession of stars, which become smaller and smaller as they recede from the central undefined mass, exhibiting an appearance like

beads threaded on the wire, which is extremely favourable to bisection.

The elements of one of the comets above mentioned were announced to the Society as computed by Mr. Taylor, sen., and Mr. Taylor, jun., of the Royal Observatory, and M. Capreci, of Naples. They are respectively, as below:—

	Taylor, sen.	Taylor, jun.	Capreci.
Passage of perihelion . .	Dec. 10^{d}.9338 Greenwich. M. T.	Dec. 10^{d}.4559 Greenwich. M. T.	Dec. 8^{d}.895 Naples. M. T.
Longitude of ditto	318° 3′ 57″	319° 10′ 26″	317° 24′ 40″
Longitude of ☊ .	35 46 58	35 45 36	35 19 50
Inclination of orbit	33 20 40	33 30 42	32 44 20
Perihelion distance	1·22951	1·24633	1·20808
Motion . . .	Retrograde. From 3 observ.	Retrograde. From 3 observ.	Retrograde. From 4 observ.

A letter was read from Mr. R. Comfield, a member of the Society, to Dr. Gregory, describing an appearance noticed by him with a Gregorian reflector, power 350, and by Mr. J. Wallis, the lecturer on astronomy, with a Newtonian telescope, power 160, in reference to the occultation of *Saturn* on Oct. 30th. To each of them that part of the ring of *Saturn* which last *emerged* from the moon's dark limb (neither of them could observe the immersion) was rendered sensibly more obtuse, and at the instant after separation approximating to a rectilinear boundary. At the emergence of the eastern limb of the *globe* of *Saturn* a similar effect was observed by Mr. Comfield, but not by Mr. Wallis.

A paper was next read on the determination of latitudes by observations of azimuths and altitudes alone, by M. Littrow, Assoc. Ast. Soc. This paper includes the consideration of four cases. In the 1st, the latitude is computed from the observed azimuth and altitude. In the

2nd, two observed altitudes are taken, and the two instrumental azimuths at the same respective moments; and the latitude is found from the corrected altitudes, and the *difference* of the azimuths, with the addition of an *approximate* latitude. In the 3rd case, three observed latitudes, and three corresponding azimuths, or two azimuthal differences are required; and the latitude is thence determined. In a 4th case, the problem is solved by means of a watch instead of an azimuth circle. There are supposed given, the time of culmination only within half or three-quarters of an hour, three altitudes taken within that distance of the meridian, and their intervals in time; to find the true latitude. The solutions to all the four cases are exceedingly simple, and the resulting formulæ admit of the utmost facility of application.

Lastly, there was exhibited to the Society a model of one of the large reflecting telescopes made by Mr. John Ramage, of Aberdeen, and of the stands, frame, and mechanism for facilitating its motions and adjustments. The reading of a descriptive paper, by Mr. Ramage, was also commenced; but its termination was postponed until the December meeting.

Scotch Patents, 1825.

To Timothy Burstall, Leith, and John Hill, Bath, for a locomotive or steam carriage—14th March.

To Moses Poole, Middlesex, for the preparation of certain substances for making candles—16th June.

To Henry Burnett, Middlesex, for improvements in machinery—24th June.

To George Dodd, Middlesex, for improvements in fire extinguishing machinery—23rd June.

To William Mason, Middlesex, for improvements in axletrees—24th June.

To Maurice de Taigh, Warrington, for improvements in spinning machines, &c.—2nd July.

To Philip Brookes, Stafford, for an improvement in the making of dies, moulds, or matrixes—2nd July.

To John Martin Hanchelt, London, and Joseph Delvalle, Middlesex, for improvements in looms—2nd July.

To John Charles Christopher Raddatz, London, for improvements on steam engines—2nd July.

To Jean Jacques Saintmarc, Surrey, for improvements in the process of, and apparatus for distilling—8th July.

To James Kay, Lancaster, for improved machinery for preparing and spinning flax, hemp, &c.—29th July.

To John Ruthven, Edinburgh, for an improved machine or press for printing—3rd August.

To Joseph Farey, Middlesex, for an improvement in lamps—5th August.

To Jonathan Andrew, Gilbert Tarlton, and Joseph Shepley, Manchester, for improvements in the construction of a machine used for throstle and water spinning of thread or yarn—8th August.

To James Tulloch, London, for improvements in the machinery to be employed for sawing and grooving marble, &c.—11th August.

To Walter Hancock, Middlesex, for improvements in pipes or tubes for the passage or conveyance of fluids—7th August.

To Edward Jordan, Norwich, for a new mode of obtaining power applicble to machinery—11th August.

To John Crosley, Middlesex, for an improvement in the construction of lamps or lanthorns—19th August.

To Marc Isambard Brunel, London, for certain me-

chanical arrangements for obtaining powers from certain fluids—19th August.

To Richard Badnal, younger, Stafford, for improvements in the manufacture of silks—19th August.

New Patents Sealed, 1825.

To Thomas Steele, of Magdalen College, Cambridge, Esq., for his invention of certain improvements in the construction of diving bells, or apparatus for diving under water—Sealed 28th October—6 months for inrolment.

To John Seaward and Samuel Seaward, of the Canal Iron Works, in the parish of St. Ann, Poplar, in the county of Middlesex, engineers and co-partners, for their invention of a new or improved method or methods of propelling boats, craft, and all kinds of vessels on canals, rivers, and other shallow waters—2nd November—6 months.

To William Ranyard, of Kingston, in the county of Surrey, tallow-chandler, for his new invented circumvolution brush and handle—2nd November—2 months.

To Vernon Royle, of Manchester, in the county palatine of Lancaster, silk manufacturer and throwster, for his invention of certain improvements in the machinery for cleaning and spinning of silk—1st November—2 months.

To John Isaac Hawkins, of Chase Cottage, Pancras Vale, in the county of Middlesex, civil engineer, for his

invention of improvements on certain implements, machines or apparatus, used in the manufacturing and preserving of books, whether bound or unbound—1st November—6 months.

To John Ridgway and William Ridgway, both of Cauldon-place, in the Staffordshire Potteries, manufacturers of china, stone, and earthenware, for their invention of an improved cock, tap, or valve, for drawing off liquors—1st November—2 months.

To Thomas Seaton, of Bermondsey, in the county of Surrey, shipwright, for his invention of certain improvements on wheeled carriages—5th November—6 months.

To George Hunter, of the city of Edinburgh, late clothier, for his having invented and brought to perfection a new improvement in the construction, use, and application of wheels—5th November—six months.

To Thomas Shaw Brandreth, of Liverpool, in the county of Lancaster, Esquire, barrister-at-law, for his new invented or improved mode of constructing wheel carriages—8th November—6 months.

To Samuel Brown, of Eagle Lodge, Old Brompton, in the county of Middlesex, Gentleman, for his invention of certain improvements in machinery, for making or manufacturing casks or other vessels—8th November—6 months.

To William Erskine Cockrane, of Regent-street, in the county of Middlesex, for his invention of improvements in certain cooking apparatus—8th November—6 months.

To John William Hiort, Chief Engineer in our Office of Works and Public Buildings, Whitehall, architect and surveyor, for his having invented and found out an improved chimney or flue, for domestic and other purposes—8th November—2 months.

To Charles Louis Giroud, of Lyons, in the kingdom

of France, at present residing at No. 13, Queen-street, Soho, in the county of Middlesex, for his having invented or found out, a chemical substitute for gall nuts, in all the different branches of the arts, or manufactures, in which gall-nuts have been accustomed, or may hereafter be used—8th November—2 months.

To James Wilks, of Roachdale, in the county palatine of Lancaster, tin-plate worker, and John Erroyd, of the same place, grocer and tallow-chandler, for their having invented and found out an engine for cutting nails, sprigs, and sparables, on an improved system—8th November—6 months.

To John James Alexander Macarthy, of Pall Mall-place, in the parish of St. James, in the city of Westminster, for his invention of a new or improved pavement, pitching, or covering for streets, roads, ways, and places—10th November—6 months.

To Benjamin Cook, of Birmingham, in the county of Warwick, brass-founder, for his invention of a new method of rendering ship's cables and anchors more secure, and less liable to strain and injury, while the vessel lays at anchor—10th November—6 months.

To Benjamin Cook, of Birmingham, in the county of Warwick, brass-founder, for his invention of certain improvements in the binding of books and portfolios, of various descriptions—10th November—6 months.

To Johann George Deyerlein, of Mercer-street, in the parish of St. Martin-in-the-Fields, and county of Middlesex, smith and tool-maker, in consequence of a communication made to him by a learned foreigner, residing abroad, for certain improvements on weighing machines, which machines he denominates German Weigh Bridges—10th November—6 months.

To Samuel Parker, of Argyle-street, St. James's, in the county of Middlesex, bronze and iron-founder, and William Francis Hamilton, of Nelson-street, Long-lane, in the county of Surrey, engineer, for their invention of a certain alloy or alloys of metals—12th November—6 months.

To Edward Bowring, of Goldsmith-street, in the city of London, silk manufacturer, and Robert Stamp, of Buxted, in the county of Sussex, weaver, for their invention of certain improvements in the working, weaving, or preparing silk, and other fibrous materials used in making hats, bonnets, shawls, and other materials—17th November—6 months.

To James Guestier, of Fenchurch-buildings, in the city of London, Esquire, in consequence of a communication made to him by a certain foreigner, residing abroad, for an invention of a mode or modes of making paper from certain substances which are thereby applicable to that purpose—17th November—6 months.

To Alexander Lamb, of Princes-street, Bank, in the city of London, Gentleman, and William Suttill, of Old Brompton, in the county of Middlesex, flax-spinner, for their invention of certain improvements in machinery, for preparing, drawing, roving, and spinning flax, hemp, and waste silk—17th November—6 months.

To George Borradaile, of Barge-yard, Bucklersbury, in the city of London, merchant and furrier, for an invention communicated to him by a person residing in foreign parts, of an improved method of making or setting up of hats or hat bodies—17 November—6 months.

D.	H.	M.	S.	
1	8	0	0	☾ in conj. with o in Leo.
1	17	0	0	☾ in conj. with π in Leo.
2	16	7	0	☾ in □ last quarter.
3	14	48	16	♃'s 1st Sat. will immerge.
5	15	0	0	☾ in conj. with ι in Virgo.
6	0	0	0	♂ in conj. with γ in Virgo.
6	14	27	22	♃'s 2nd Sat. will immerge.
7	0	0	0	♀ in conj with 4 ζ in Lib.
7	1	0	0	☿ in conj. with λ in Sagitt.
8	3	0	0	☾ in conj. with δ in Scorpio.
8	17	0	0	♀ in conj with κ in Libra.
9	0	0	0	☉ eclipsed invisible in London, but will be centrally eclipsed in long. 127° 16′ W, and lat. 9° 10′. N.
9	8	34	0	Ecliptic Conjunction or ● New Moon.
10	7	0	0	☽ in conj. with 1 μ in Sag.
10	7	0	0	☽ in conj. with 2 μ in Sag.
10	16	41	35	♃'s 1st Sat. will immerge.
10	22	0	0	♀ in conj. with λ in Libra.
11	9	0	0	☽ in conj. with d in Sag.
11	19	0	0	☿ in conj. with σ in Sag.
12	13	0	0	☽ in conj. with β in Cap.
13	6	0	0	♀ in conj. with 1 β in Scor.
13	6	0	0	♀ in conj. with 2 β in Scor.
13	17	1	11	♃'s 2nd Sat. will immerge.
14	13	0	0	♀ in conj with ν in Scorpio.
16	7	0	0	☿ in conj. with ψ in Sag.
16	19	6	0	☽ in □ first quarter.
17	18	34	53	♃'s 1st Sat. will immerge.
19	23	0	0	♂ in conj. with ϑ in Virgo.
21	7	0	0	☽ in conj. with δ in Aries.
21	13	46	0	☉ enters Capricornus.
22	0	0	0	☿ Stationary.
22	7	0	0	☽ in conj. with A in Tau.
22	17	0	0	☽ in conj. with 2 η in Tau.
23	10	0	0	☽ in conj. with ι in Taurus.
23	15	0	0	☽ in conj. with ♄ long. 16° 22′ in Gemini ☽ lat. 30′ 21″ S. ♄ lat. 1° 32′ S. diff. lat. 1° 01′ 39″
24	17	0	0	☽ in conj. with η in Gem.
24	20	0	0	☽ in conj. with μ in Gemini.
24	21	13	0	Ecliptic opposition or ☉ full moon.
24	23	0	0	☾ in conj with ν in Gem.
25	14	0	0	☾ in conj. with ζ in Gem.
26	14	56	32	♃'s 1st Sat. will immerge
27	16	0	0	☾ in conj. with 1 α in Can.
27	17	0	0	☾ in conj. with 2 α in Can.
28	12	0	0	☿ in conj with π in Sag.
28	13	0	0	☾ in conj. with o in Leo.
28	22	0	0	☾ in conj. with π in Leo.
31	11	26	13	♃'s 2nd Sat. will immerge.

The waxing ☽ moon—the waning moon ☾

Rotherhithe. J. LEWTHWAITE.

METEOROLOGICAL JOURNAL, OCTOBER AND NOVEMBER, 1825.

1825.	Thermo.		Barometer.		Rain in inches.	1825.	Thermo.		Barometer.		Rain in inches.
	Higt.	Low	+	—			Higt.	Low.	+	—	
OCT.						NOV.					
26	46	30	30,00	29,90		10	44	29	29,87	29,80	,35
27	48	35	29,96	29,91		11	41	35	29,53	29,30	,475
28	60	39	29,95	29,90		12	44	30	29,80	29,70	
29	60	45	29,98	29,90		13	40	22,5	29,85	Station	
30	60	38	29,93	29,80	,15	14	46	29	29,86	29,77	
31	57	39	29,96	29,86	,025	15	44	33	30,00	Station	
NOV.						16	44	27	30,10	Station	
1	59	42	29,90	29,74		17	48	33	30,07	29,82	
2	55	42	29,70	29,68	,075	18	53	32	29,90	29,74	,1
3	54	46	29,10	29,00	,025	19	49	32	29,80	29,87	,125
4	50	33	29,65	29,40	,225	20	47	30	30,04	Station	,075
5	46	28	29,70	Station		21	56	41	29,80	29,70	
6	51	42	29,20	Station		22	44	35	30,00	29,79	,175
7	44	30	29,20	Station	,125	23	46	30	30,18	30,10	
8	47	28	29,34	28,96	,025	24	52	45	30,10	30,00	,05
9	47	30	29,10	29,00	,625	25	47	38	30,20	30,10	,15

CHARLES H. ADAMS, LOWER EDMONTON.

LITERARY AND SCIENTIFIC NOTICES.

Dr. Johns, of Manchester, F.L.S. has nearly ready for publication, An Introduction to the Linnæan System, the first Part; the second, the Genera of British Plants, in a tabular form, will shortly follow.

On the eve of publication, a new and greatly extended edition, in 2 vols. 8vo. of the work entitled, An Introduction to the Knowledge of rare and valuable Editions of the Greek and Latin Classics. By Thos. Frognall Dibdin, D.D. F.R.S. F.A.S.

In a few days will be ready for publication, the first Part of Simpson's New Work of Anatomy, as applicable to the Fine Arts. The object of the present work is to assist the student of the Fine Arts in the necessary acquisition of anatomical knowledge, which he has hitherto been obliged to collect insufficiently from meagre catalogues of the names merely of parts drawn up for the use of artists, or to cull with unprofitable, and, perhaps, disgusting labour from voluminous works appropriated to the uses and necessities of the surgeon.—The first Part will contain the anatomy of the bones and joints, and will be illustrated by 13 highly finished lithographic plates.

Rust.—During the residence of the Swedish Ambassador at Paris, he received a proposition from a firm of the name of Mazet and Co. to disclose to the proprietors of the Swedish Mines, for the sum of 300,000 francs, the secret of preserving from rust all articles of iron, by means of a certain metallic composition. The proposition has been submitted to the consideration of the College of Mines and Commerce, in conjunction with the Academy of Science, and Delegates from the Iron Trade, and it is thought it will be acceded to. This is a subject which has been patented by several individuals in England.

The Edinburgh Geographical and Historical Atlas is announced as preparing for publication. Size royal folio, and in monthly Numbers.

A work is announced as going to press, by the Rev. Christopher Anderson, called The Constitution of the Human Family; with the Duties and Advantages which are involved in that singular Constitution.

In December will be ready, Mathematical Tables; containing improved Tables of Logarithms, &c. preceded by a copious introduction, with a collection of appropriate exercises. By William Galbraith, A.M. Lecturer on Mathematics, Edinburgh.

Lottery of Pictures.—A number of fine Pictures, brought from the Gallery of Malmaison, and now at Augsburgh, the value of which is estimated at one hundred thousand florins, are to be disposed of by way of Lottery. It is to consist of twenty-two thousand tickets, and forty prizes, and the drawing is not to take place for a year. The price of each ticket is five florins thirty kreutzes.

French Literature.—An immense MS. mass of interesting correspondence between Huet, the celebrated Bishop of Avranches (a biography of whom we have written by Aikin) and many of his most distinguished contemporaries (such as Bossuet, Dacier, De Scudery, Leibnitz, &c.) has it is stated lately been discovered at Caen.

Antiquities.—As the work of excavating at Arles proceeds, the Roman antiquities are discovered to be far more extensive and important than was originally supposed. A vast amphitheatre of three tiers, and curious subterranean vaults, are being gradually disclosed.

A General Heraldic Dictionary of the Peerage and Baronetage of the United Kingdom for 1826. By John Burke, Esq. is announced as nearly ready.

Lectures on Mathematics, delivered last winter to the Artizans of Paris by Baron Charles Dupin, are now in course of publication in that capital. An English translation, with additions, &c. is preparing.

LONDON:
SHACKELL, ARROWSMITH, AND HODGES, JOHNSON'S-COURT, FLEET-STREET.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. LXII.

Recent Patents.

To William Francis Snowden, *of Oxford Street, in the Parish of St. George, Hanover Square, in the County of Middlesex, Mechanist, for his new Invented Wheel-way, and its Carriages for the Conveyance of Passengers, Merchandize, and other things along Roads, Rail and otherways, either on a level, or inclined plane, and which said contrivances are applicable to other purposes.*

[Sealed 18th December, 1824.]

Part of the subjects comprehended under this patent, possess features of such extraordinary peculiarity, that we expect the risibility of our readers will be excited when they are told that instead of the old fashioned mode of attaching horses before a carriage, for the purpose of drawing it, the patentee proposes to put his horses into the carriage, in order to propel it much in the same manner as horses travel in a mill. Singular as this contrivance may appear, the patentee feels perfect confidence

in its advantages, and promises us that a very short space of time will elapse before his improved carriages are exhibited in action, to the demonstration of their superiority over every other kind of loco-motive engine hitherto invented.

The subjects of the patent are divided into two heads, the first of which, is denominated a wheel-way, and consists of a hollow trunk, with a platform of iron on the top, for trams or other carriages to run upon; within this trunk, a machine is to travel, called a *mechanical horse*, to which is attached an horizontal toothed-wheel, revolving upon a vertical axle, and taking into the teeth of a rack fixed on the side of the wheel-way within the trunk; this toothed-wheel being actuated by a steam-engine or other power, will cause the mechanical horse to move forward in the trunk, and by proper attachments to draw the train of trams or other carriages after it, along the platform, above the wheel-way. The second head of the invention, is the carriage for the conveyance of passengers or goods, to be attached to the mechanical horse, and the mode of actuating it, by men or horses labouring within the vehicle; which carriage runs upon the platform above the wheel-way, and instead of receiving motive force from the mechanical horse, is intended to give the propelling power thereto, by means of wheels and pinions actuated by manual or horse-labour, as above said, in place of employing steam. The same description of carriage, and the mechanism for driving it, may also be employed upon common roads, by substituting ordinary carriage-wheels instead of the mechanical horse above-mentioned, and actuating those wheels by a rotatory power in the manner about to be described. These contrivances are exhibited in several figures in Plate XVI.

The mode of constructing the wheel-way is shown in

the cross section, fig. 1, in the horizontal view, fig. 2, and in the longitudinal section, fig, 3; in all of which figures, the mechanical horse A, is seen in action. A hollow trunk is formed resting upon suitable bearings on the ground, or sometimes below the surface in an excavation, or raised up according to the natural undulations of the land over which it is to pass, the object being to lay the wheel-way as nearly upon a level as possible. This trunk consists of two side-rails, *a, a,* suitably braced together, which support the platform, *b, b,* at top, and grooves or recesses are formed, by means of flanges in the side-rails for the wheels *c, c,* of the mechanical horse to run in. On the upper side of the mechanical horse, there are anti-friction rollers, *d,* placed in horizontal positions, the peripheries of which run against the side rails, *a, a,* for the purpose of steadying the motion, and preventing the wheels from rubbing. There is also on the upper side of the mechanical horse, a toothed-wheel, *e,* which takes into a rack, *f,* on one of the side-rails, and this toothed-wheel being made to revolve, by means of a steam-engine or any other sufficient power applied to its axle, *g,* causes the mechanical horse to traverse along the wheel-way. The steam-engine may be placed upon a carriage, as at B, the wheels of which shall run upon the platform *b,* above, and communicate a rotatory impulse to the axle *g,* by means of the alternating pistons, cranks, and bevel gear, for the purpose of turning the wheel *d,* in the rack *f,* and thereby driving the mechanical horse along the wheel-way. To the tail of the engine-carriage, the trams or other waggons, C, C, are to be attached, and where the platform *b,* is without flanges to guide the waggon-wheels, rods *i,* are to extend downwards from the under side of the waggons into the opening along the middle of the platform, *b, b,* for the purpose of confining

the waggons to their proper track; or the running wheels of the waggons may move in the grooves of the side-rails, instead of passing along the platform, the bodies of the waggons being supported by standards rising upwards through the opening of the platform. The patentee says that "this mode of directing carriages along rail-ways by means of the internal rack and the confined running wheels, is particularly desirable when the carriages are required to travel with great velocity, as in transporting passengers as well as goods from place to place."

It is further proposed to adapt this kind of railway and mechanical horse to the towing of vessels on canals or rivers, by erecting such wheelways upon strong standards by the canal or river side, as shewn at fig. 4; *a*, *a*, are the side-rails of two wheel-ways, securely attached to the iron frame work; *b*, *b*, are the mechanical horses, running upon the lower flanges of the side rails; *c*, *c*, are the stems for supporting the carriages in which the conductors are placed; *d*, *d*, are the racks bolted to the frames of the wheel-way; *e*, *e*, are toothed-wheels attached to the carriages, and *f*, *f*, are their pinions. The conductors by turning the winches, *g*, *g*, give the rotatory power to the pinions that actuate the toothed-wheels, and these taking into the fixed racks, cause the mechanical horses and their attached carriage, to advance; when the ropes, *h*, *h*, made fast to barges, or other vessels, and to the stems of the carriages, will by these means tow the vessels forward.

In raising ponderous bodies up steep ascents in boxes or carriages, by means of standing engines, it is proposed to employ a wheel-way of the kind shewn at fig. 5, which consists of a series of toothed-wheels and pinions, taking into each other, and acting as a train, the moving power being communicated at either extremity, or in any part of the train. The carriages or boxes, *a*, *a*, which are to con-

tain ponderous substances, are placed upon wheels or rollers, *b, b*, that run in grooves, much in the same way as the mechanical horse first described; these carriages have racks *c*, attached to them, which take into the teeth of the wheels, *d*, and by the rotation of these wheels, the carriages are conducted backward and forward. This description of wheel-way may be placed vertically, horizontally, or at any inclination, and is calculated for transporting heavy bodies from one level to another, as in raising coal or ore from mines.

The carriages, which forms the second head of this invention, may be employed in connection with the mechanical horse, and run upon a wheel-way, as described above; or they may be made to run upon ordinary roads; the peculiar mode of producing the impelling power for driving them, and the mechanism appertaining thereto, constituting the particular features of invention claimed under this part of the patent.

Fig. 6, shews a carriage of this description, consisting of a circular floor, upon which two horses are made to travel round as in a mill. The horses are yoked to horizontal levers, *a, a*, extending from the central shaft, *b*, to the lower end of which is attached a large toothed wheel (not seen in this perspective view), and the power exerted by the horses, as they travel round within the carriage, causes this wheel to revolve in a horizontal direction, which, by taking into pinions placed against its periphery, actuates bevel gear that gives rotatory motion to the axles of the running wheels. These axles have palls or catches, that drop into ratchets upon the naves of the running wheels; and hence, by the rotation of the axles, the wheels are driven round, and the carriage conducted forward.

When this construction of carriage and its mechanism

is adapted to the wheel-way above described, the traversing of the horses round the circuit gives rotation to the large toothed wheel upon the floor of the carriage, and this actuating a pinion at the top of the shaft, *g*, fig. 1, 2, and 3, causes the contrivance called the mechanical horse to be driven along the wheel-way in the manner above shewn, and consequently the carriage to be by those means conducted forward on the platform of the wheel-way.

The steering of the carriage, shewn at fig. 6, when moving upon an ordinary road, is effected by a director, who stands in front, and turns a horizontal steering-wheel, *c*. This wheel is attached to a vertical shaft, *d*, having at its lower extremity a pinion taking into a semi-circular rack under the carriage, extending from the axle-tree of the fore-wheels; and, by turning this pinion and rack, the axle of the fore-wheels is placed at an angle to the axle of the hind wheels, and the pall of the axle slipping back over the ratchet, upon the nave of the receding wheel, the carriage is thereby made to proceed in a curved track.

The patentee considers that the ratchets and palls last described, may be advantageously adapted to hay making machines and drills, or other machines where the rotation of the running wheels communicate motion to other parts of the mechanism.

From the leverage gained by the length of the yokes over the toothed-wheel and pinion that actuates the mechanical horse or the running wheels, the patentee proposes to obtain a power at a small expense of labour, that shall enable him to propel his carriages with any velocity that circumstances may require.

[*Inrolled June*, 1825.]

To Charles Powell, *of Rockfield, in the County of Monmouth, Gentleman, for his having invented and brought to perfection an Improved Blowing Machine.*

[Sealed 7th June, 1825.]

This improved blowing machine is made in the form of a drum, with partitions that divide the interior into several compartments or air chambers, in each of which a piston is placed in a position radiating from the center, and the drum being made to revolve upon its axis, the pistons fall from side to side in their chambers by gravitation, expelling the air through valves which open outwards, and receiving fresh supplies of air into the chambers by valves opening inwards.

The principles upon which this machine is intended to act will admit of some variations in its construction and detail, but the general forms proposed as eligible are shewn in Plate XVII. Fig. 1, is a section of the blowing machine, the side being removed for the purpose of exhibiting the internal construction of the drum, with its partitions, and the situations of the pistons within the several compartments. Fig. 2, is a transverse section of the same, in which the valves and the discharge pipe are more particularly seen.

This drum is mounted upon standards, and revolves upon its axle on one side, and upon its discharge pipe on the other, by means of a winch, or by a band and rigger, actuated by a steam engine or other first mover.—*a*, *b*, *c*, *d*, *e*, *f*, are six pistons formed in the shape of wedges, and vibrating upon axles or pivots near the center of the drum; *g*, *h*, *i*, *k*, *l*, *m*, are six partitions dividing the drum into the six compartments, *n*, *o*, *p*, *q*, *r*, *s*. The valves *t*, *t*,

(see fig. 2,) open inwardly, and are placed in boxes on the outside of the revolving drum, for the purpose of admitting air to the chambers; the valves, *u*, *u*, are in the opposite side of the drum, opening outwardly, through which the air is expelled into the external chamber or box, *v*, *v*, and thence through the pipe *w*, in a continued blast.

When the drum is made to revolve, the several pistons successively come into action in the following manner:—Supposing the piston *a*, to rest against the partition *g*, on that partition reaching a perpendicular position, the piston *a*, will by its gravity fall over to the left, as shewn, expelling the air from the chamber, *n*, through the valve *u*, at the partition *h*: and the valve *t*, at the partition *g*, opening inwardly at the same time, allows a fresh supply of air to enter the chamber *n*, behind the piston. By the time that the drum has proceeded one-sixth part of a revolution, the piston *a*, will have fallen into the situation of the piston *b*, having nearly expelled all the air through the valve *u*, from the chamber on that side, which is below the piston; and a fresh supply of air entering the chamber through the valve *t*, at the partition *g*, as above described, fills the chamber ready for the next action of the piston. When the drum has proceeded two-sixths of its revolution the partition *g*, will be in the situation of the partition *i*, and the piston *a*, will have fallen into the situation of *c*, and the pistons *f*, and *e*, will respectively have advanced to the situation of *b*, and *a*, each in its turn expelling the air from its chamber, in the manner above shewn.

The farther progress of the revolving drum will bring up the pistons in succession into the situations shewn, and each expelling the air from the compartment in which it acts, will cause the air so expelled, to enter the external

chamber or box, *v, v,* and thence to proceed as a blast through the pipe *w,* to the aperture of the furnace, or wherever the current of wind is to be directed.

As the drum revolves, there is a double action of the pistons, by which two blasts of air are expelled at the same time. Supposing any one of the pistons to be in the situation of *c,* bearing against the partition *k;* as the rotation of the drum proceeds, the partition *k,* will pass on to the situation of *l,* when the force of gravitation causing the piston to fall from the partition into the situation of *d,* the air in the compartment will be expelled through the valve *u,* into the external chamber *v,* as before, and the valve *t,* opening, admits air into the chamber on the reverse side of the piston. In the same way each of the pistons in succession, as the drum revolves, produces by its retrograde action, the second expulsion of air from its chamber, after passing its lower perpendicular position, and thus an uninterrupted blast is kept up as long as the drum continues in motion.

The patentee does not confine himself to the precise number of six chambers and pistons, as a greater or less number may, according to the magnitude and desired power of the machine be desirable, one piston being made to act in each chamber in the manner shewn, and the edges of the pistons being properly packed to prevent the escape of the air, though at the same time so as to produce as little friction as possible.

This apparatus is also proposed to be adapted as an exhauster, in which capacity, it is considered that it might be very usefully employed for drawing foul air from mines, holds of ships, and other situations where an exhausting apparatus may be requisite. The internal construction and action of the exhauster would be precisely the same as the blowing machine, excepting, that for the

purpose of drawing out air, a fixed chamber or box *y*, *y*, is to be placed at the outside of the drum, enclosing the valves *t*, *t*, but allowing the drum to revolve, with a pipe *x*, leading from the mine or other place below, containing the foul air into the chamber. This box and pipe is shewn by dots in fig. 2.

When this box is adapted, and the rotatory motion is given to the drum, the valves *t*, *t*, receive their supply of air from the pipe *x*, through the fixed chamber *y*, and expel it at the valves *u*, *u*, by the operations of the pistons as above described. This exhauster will act without the box *v*, and pipe *w*, by placing an axle upon which the drum shall revolve, and the foul air will then be expelled into the common atmosphere.

A variation in the construction of this improved blowing machine is shewn at figs. 3, and 4, which produces a single blast; it is the combination of a series of bellows of the ordinary kind, placed radiently round a central tube, or hollow cylinder, upon which they are intended to revolve as their common axle, and to act by gravitation in the following manner:—

The respective bellows are formed by two square boards, the one fixed, the other moving upon a hinge joint, as a flap, which boards are connected together on three sides by flexible leather as ordinary bellows, producing an air tight chamber within, of a wedge form, varying in its capacity, as the flap or moving board, rises and falls upon its hinges.

Fig. 3, is an elevation or side view of the machine complete; fig. 4, is a section of the same, shewing the interior; *a*, *b*, *c*, *d*, *e*, *f*, *g*, and *h*, are eight pairs of bellows, fixed at equal distances apart to the central plates *i*, and to the outer rings, *k*, *k*; the bottom board of each bellows is made fast to the central plates, and to the outer rings,

while the upper board or flap is allowed to rise and fall freely upon its hinge joints; *l*, is a hollow cylindrical tube, fixed upon the standards, *m*, *m*, (shewn detached at fig. 5,) upon this fixed tube, the machine revolves, being previously balanced; *n*, is a rigger attached to the side of the machine, over which a band passes from a steam engine or any other first mover. This band being put in motion, causes the rigger and with it, the machine to revolve upon its stationary axle *l*, and by means of gravity, the bellows are successively brought into action.

It will be seen in the figures, that the bellows, *a*, hang in a collapsed state, out of action, but when as the machine revolves, it has arrived in the situation of *b*, the gravity of the weight will have caused the movable board or flap to recede from the fixed board; and the valve opening, enables the air to occupy the interior. By the time that the bellows has arrived at the situation of *c*, the flap has opened nearly to its greatest angle, and the interior becomes filled with air. The bellows pass on as the machine revolves to the situations of *d*, and *e*, but when arrived at *f*, the weight begins to press the flap down, and the air is now expelled through the nozzle into the hollow tube *l*, there being an opening or slot in the tube, through about one-fourth of its circumference, and equal in length to the width of the nozzle of the bellows (seen more evidently in the detached fig. 5). As the machine proceeds in its revolution, the expulsion of the air is continued, the upper board or flap, descending upon the lower board, as at *g*, and when the bellows has arrived at the situation of *h*, the air has been entirely expelled, and the flap falls in the collapsed state seen at *a*, as before mentioned. Thus a series of revolving bellows, placed radiently round a central tube, are in succession made to fill themselves with air, and to expel the air in a com-

pressed state through the nozzle, for the purpose of producing a powerful and continued blast of wind; the tube *l*, on which the machine revolves, acting as a valve, so as to close the exit passages of the several billows, and prevent the escape of the air, except at that part of the revolution where they are intended to be brought into action.

The patentee says, he does not claim any novelty in the construction of the individual bellows of which this last described machine is constituted, "they may be made square, or of any other form that may be deemed eligible, but square bellows I prefer, and they may be constructed of wood and leather as usual, or of any other suitable material. Neither do I confine myself to any particular dimensions, nor to any precise number of bellows so combined, but I rest my claim, as respects this kind of blowing machine, in so combining a series of bellows that they may be made to revolve, and in so doing, fill themselves with air, and by the gravitation of heavy or weighty flaps, to expel the wind with great force, through a tube, as the machine revolves. And, as respects the double blowing machine first described, I claim the employment of a series of pistons, acting in a series of revolving air chambers, by means of gravitation for the expulsion of air in the manner above described, whatever be the number of those chambers and pistons, and of whatever materials the same may be made."

The patentee considers that by this combination of bellows, placed radiently round an axle, and made to revolve, that a great portion of the power requisite for working a blowing machine of equal capacity, will be saved; in fact, that little more power will be required at any time to work the whole series, than is necessary to raise the flap of one bellows.

[*Inrolled, December*, 1825.]

To JAMES NEVILL, *of High Street, Southwark, in the County of Surry, Engineer, and* WILLIAM BUSK, *of Broad Street, in the City of London, Esquire, for their Invention of certain Improvements in propelling Ships, Boats, and other vessels or floating bodies.*

[Sealed 6th September, 1824.]

THIS invention is a further improvement upon certain modes of propelling, described in the specification of a patent granted to the above-mentioned William Busk, and dated 29th of June, 1824, the particulars of which are given in our present Vol. page 243. The improvements now introduced, consist in "a peculiar situation and form of hollow space in a boat or steam vessel, by the action against which, of either water or air, in manner hereafter to be explained, a forward motion of the said boat or other vessel is obtained."

Plate XVII. fig. 6, is the section of a boat upon the improved plan, taken lengthwise; *a, a,* is the hollow space in the under part, which the patentee says "should be as nearly as possible of the shape and proportions here shewn," (no scale of dimensions is exhibited); *b,* and *c,* are planes or paddles vibrating upon a hinge joint at *d*; these paddles consist of three long pieces, of which *b,* is broad, and acting in the middle between two narrow ones, *c.* They are furnished with flaps or valves opening downward, for the purpose of allowing the water to pass as the paddles rise, but forming a resistance as they descend; *e,* and *f,* are rods respectively attached to the paddles, *b,* and *c,* and to levers, *g,* and *h,* which levers are made to vibrate by the reciprocating action of a steam-engine, or any other first mover, and hence the paddles are made to vibrate also.

On the descent of either of the paddles, their valves close against the water, and the oblique direction of the stroke given by the paddle, causes the vessel to be propelled in an opposite direction. There should be one or two valves near the hinge joint of each paddle, opening upwards, for the purpose of allowing water to pass into the vacuum space behind the paddle, as it descends, and which, as the paddles rise again, close, and cause a portion of water to be thrown against the inclined plane, on the upper side of the recess, and assist in propelling the vessel.

Fig. 7, represents the section of a boat, to be propelled by pumping air; *a*, is a recess or trunk, formed in the stem of the boat; *b*, *b*, is a cylinder, with a piston *c*, the rod of which is connected to the vibrating beam of a steam engine. Water flows into the recess, and into the cylinder, as shewn, and the effect of the apparatus is thus described by the patentee:—"The downward stroke of the piston, will expel both the water and air, which rushing out into, and passing through the trunk, will cause such an action both of the water and air against the upper inclined surface of the trunk, as will induce a forward motion of the boat or vessel." On the piston rising, the valves *d*, will open and admit air into the cylinder, and also allow the water to rise, which by the down stroke of the piston will be again expelled in a similar manner, and with the same effect as before. The specification proceeds to say:—"It will be seen that if two cylinders and pistons are used, a continuous forwarded motion of the boat or vessel will be obtained." How clearly this effect may be *seen* by our readers, we will not venture to determine, but certainly it has never been seen by the patentees, except in "the mind's eye."

[*Inrolled March*, 1825.]

To John Heathcoat, *of Tiverton, in the County of Devon, Lace Manufacturer, for his Invention of certain Improvements in the Methods of Preparing and Manufacturing Silk, for Weaving and other purposes.*

[Sealed 15th June, 1824.]

The improvements in the methods of preparing silk, which constitute the subjects of this patent, are, the union of the two processes of drawing off the silk from the cocon, and twisting it into a thread, by the operations of one machine, that is, without the intervention of hanking and winding.

To effect this object, an apparatus is employed similar to that shewn in Plate XVIII, fig. 6, which is an end view; *a*, is a vessel containing water, to be heated by a fire below. In this vessel several cocons are placed, and the filiments from each brought through the eye of the wire *b*, and being so united, are carried thence to the guide *c*, then round the roller *d*, which is covered with plush, to produce friction, and over a glass rod, *e*, down to the spindle and flyer.

The moving power by which the spinning machine is to be actuated, is applied to the axle of the drum *f*, by a band and rigger, as usual, and a cord passing from this drum to the pulley, drives the spindle and flyer as in ordinary spinning machines. At the further end of the axle of *f*, a pinion is affixed, which takes into the teeth of the wheel *g*, and a pinion upon the axle of this wheel drives the wheel *h*, which by a pinion upon its axle, gives rotation to the wheel *i*, that carries the heart-wheel *k*, upon the front end of its axle.

The pulley and spindle *l*, being made to turn rapidly by the cord from the revolving drum *f*, as above said, the

flyer *m*, attached to the spindle is carried round also, which draws the filiments of silk from the rollers, *d*, and over the rod, *e*, and twists them into a thread, and then lays or winds this thread upon the bobbin *n*. The bobbin slides loosely upon the spindle, and goes round with it, but the rapidity of its rotation is partially retarded by the lower end of the bobbin rubbing against the copping rail *o*, and which therefore slowly takes up the silk as it becomes sufficiently spun. In order that the silk threads may be laid uniformly, one beside the other, round the bobbin; the copping rail is made to rise and fall by means of the rod *p*, attached to the weighted lever *g*. As the heart wheel *k*, revolves, its periphery acts against the lever *g*, and as its greater or lesser diameters comes round, the lever, the rod, and the copping rail, with the bobbin, sinks or rises, and consequently brings the different parts of the bobbin to the level of the flyer, by which the thread is laid uniformly.

Only one spindle, flyer, and bobbin, has been spoken of, and shewn in the figure, but it is to be understood that there is a range of spindles extending along the front of the machine, all of which are situated and brought into action exactly in the same way.

By this operation, the several filiaments of silk, are drawn from the cocons and twisted into a thread, which is technically called *singles*, and a series of these single threads are to be combined by subsequently twisting, to produce what is called *organzine*.

It is further proposed as an improvement in the preparation of silk, to make that quality of silk called *tram*, by drawing and twisting from two sets of cocons to each spindle. This is to be performed in a machine similar to that shewn in the figure, the frame of which is, as aforesaid, to be made of sufficient length, to contain a long

series of spindles and bobbins, and the vessel *a*, is to be a long trough, containing warm water, in which the cocons are to float.

The specification states, that the claim under this patent is "not restricted to the particular form and combination of machinery here represented, but includes all the forms and combinations of machines, whereby silk can be drawn off the cocon, and twisted into a thread by one continued operation, without the intervention of hanking and winding."

[*Inrolled December*, 1824.]

To Benjamin Black, *of South Molton Street, in the Parish of St. George, Hanover Square, in the County of Middlesex, Lamp Manufacturer, for his Invention of an Improvement in Carriage Lamps.*

[Sealed 25th May, 1824.]

This invention is stated to have for its object the production of an "additional quantity of light, by the application of burners with circular wicks, and reflectors concaved to a semi-circular or parabolic line;" and the patentee says, "I claim nothing that has been used in carriage lamps before." But wherein the peculiar feature of novelty, as respects this invention, consists, we are perfectly at a loss to discover.

A square carriage lamp is described, of which the glasses in front, are made to hinge on, and fasten to the back part of the lamp frame by catches; the burner has a circular wick, and a galley, with a glass chimney, much in the same form as Argand's lamps. There is a cup to receive the oil that flows over the burner, a tube to conduct it down to the cup, and a strainer to keep it

free from dirt, and also bright metal reflectors. There are gratings and over-hanging parts in the top of the lantern, to admit air and discharge smoke; and it is intended to carry a spare glass chimney within the stem, at bottom of the lamp, which is to be kept tight by a spiral spring in the cap or cover, that shuts down upon it.

[*Inrolled November*, 1824.]

To John Dickenson, *of Nash Mill, in the Parish of Abbots Langley, in the County of Hertford, Esq. for his invention of a method of cutting Cards by means of Machinery; and also a process for applying Paste and other adhesive matter to Paper; and for sticking Paper together with Paste or other adhesive matter, by means of Machinery applicable to such purposes.*

[Sealed 20th May, 1824.]

The machine for cutting cards, consists of a pair of rollers, with circular revolving cutters, the edges of which are intended to act against each other as circular shears, and the pasteboards in passing between these rollers are cut by the circular shears, into cards of the desired dimensions. These rollers are mounted in suitable standards, with proper adjustments, and are made to revolve by a band and pulley connected to the axle of a crank, or by any other convenient means.

Plate XVIII, fig. 1, is a front view of this machine; *a*, *a*, and *b*, *b*, are the two rollers, the upper one turning upon an extended axle, bearing in the standards, the lower one upon pivots. The rollers are formed by a series

of circular blocks, between a series of circular steel cutters, which are slidden on to iron shafts, and held together upon their axle by nuts screwed up at their ends. The accurate adjustment of these cutters is of the first importance to their correct performance, it is therefore found necessary to introduce spiral springs within the blocks in order to press the cutters up to their proper bearings. A section of one of the blocks is shewn at fig. 2, and an end view of the same at fig. 3, with the spiral springs inserted.

At the outer extremity of the axle of the roller *a*, a rigger *c*, is attached, from whence a band passes to a pulley *d*, on the crank shaft *e*, to which a fly-wheel *f*, is affixed, for the purpose of rendering the action uniform. Rotatory motion being given to the crank shaft, the upper roller is turned, the lower roller moving at the same time by the friction against the edges of the cutters.

Fig. 4, is an end view of the rollers, shewing the manner in which the pasteboards are guided and conducted between the cutters. In the front of the machine a movable frame *g*, is to be placed, for the purpose of receiving the pasteboards, preparatory to cutting them into cards, and a stop is screwed to this frame for the edge of the pasteboard to bear against, which stop is adjustable to suit different sizes. From the back part of this frame an arm *h*, extends, the extremity of which acts against the periphery of a ratchet wheel *i*, fixed at the end of the roller *b*, and hence as the roller goes round, the frame is made to rise and fall upon its pivots, for the purpose of guiding the pasteboard up to the cutters; at the same time a rod *k*, hanging in arms from the sides of the standards (shewn by dots in fig. 1,) falling upon the pasteboard, confines it, while the cutters take hold, and racks, corresponding with the indentations of the rollers,

are placed as at *l*, *l*, by means of which, the cards when cut, are pushed out of the grooves.

As various widths of cards will require to be cut by this machine, the patentee proposes to have several pairs of rollers ready adjusted to act together, when mounted in the standards, in preference to shifting the circular cutters, and introducing blocks of greater or less width.

The second part of the invention is a machine for pasting the papers, and pressing the sheets together, to make pasteboard; fig. 5, is a side view of this machine, consisting of several reels (we suppose rollers are intended) on which the paper is to be wound, with a paste trough, and rotatory brushes. The several parts of this machine and their operations in making pasteboard are described in the specification, but the patentee having omitted the letters of reference in the drawing which he has inrolled, we are unable to explain it.

As far as we are enabled to understand the machine it appears that damped paper is to be wound upon two rollers, and conducted from thence over two other rollers; that two fluted rollers revolving in the paste trough are to supply paste to two circular brushes, and that by those brushes, the papers are to be pasted on one side, and then pressed together, to make the pasteboard; after this, the pasteboard is to be drawn on to a table, and to remain there until sufficiently dry to be wound upon other rollers. By comparing this description with the figure, perhaps the intended operations of the machine may be discovered, it is the best explanation we are enabled to give.

[*Inrolled November*, 1824.]

To Joël Spiller, *of Chelsea, in the County of Middlesex, Engineer, for his Invention of an Improvement or Improvements in the Machinery to be employed in the Working of Pumps.*

[Sealed 6th March, 1824.]

The specification of this patent states, that the principles of the invention consist in "so regulating the motions or strokes of the pistons of two pumps relatively with each other, that the quantity of water or other fluid raised or propelled shall constantly vary."

There are no drawings accompanying this specification, but the patentee explains his inventions by first describing the construction and action of ordinary forcing pumps, particularly such as are applied for injecting of water into an hydraulic press, for which purpose this invention appears to be particularly designed.

Suppose two pump barrels of the ordinary construction having foot valves in their rising mains as usual, to be united by a latteral tube, and from this uniting tube the discharge or injecting pipe proceeds, which conducts the water to the press; if the pistons of both pumps rise together, the barrels of both will be filled at the same time with water from their rising mains, and on the descent of the pistons together, (the foot valves closing) the whole of the water contained in both barrels, will be driven out and forced up the discharge pipe; if the two pistons be made to ascend and descend alternately, that is, one piston to rise, at the same time that the other piston falls, the volume of water contained in one barrel, will be driven through the latteral tube into the other barrel, without any of the water being forced up the discharge or injecting pipe; if the action of the pistons of the two pumps

being so adjusted to each other, that when one piston is half way down the other is beginning to descend, then every stroke of the pumps will inject a volume of water equal to the contents of one of the barrels.

Now the object of the patentee is to commence the operation of pumping with the two pistons working up and down together, when the whole volume of the two barrels will be discharged at every stroke, and to go on diminishing the quantity of water injected at every stroke until the cranks of the piston rods get into the opposite positions, so as to cause the pistons to rise and fall alternately, when the water will be driven to and fro through the union tube, without any portion of it being forced into the discharge pipe.

The mode by which this object is proposed to be effected, is by actuating the crank shafts of the two pumps by toothed-wheels, having dissimilar numbers of teeth; and these wheels being both turned by the uniform revolution of one toothed-wheel, cause the relative positions of the cranks to each other to vary, by the progressive acceleration of one crank before the other.

In charging an hydraulic press by means of this improved contrivance, the cranks that actuate the pump rods, must be so situated at the commencement of the operation, that they will cause the pistons to rise and fall together, and thereby to force out a quantity of water at every stroke, equal to the capacity of the two barrels. As the operation proceeds, the cranks revolving with different velocities, one of the pistons will move faster than the other, and by those means will have proceeded half way down its barrel, when the other piston is beginning to descend in its barrel; at this time the quantity of water forced into the discharge pipe, at every stroke, will be equal to the contents of one barrel only, and as the pump-

ing proceeds, one of the cranks continuing to advance upon the other, they will at length be in opposite positions, and the two pistons be made to ascend and descend alternately, under which circumstances the water will cease to be forced into the discharge pipe, and the pumping if continued produce no effect.

The particular object of the patentee in employing this apparatus, is to enable a uniform power to work the force pump of an hydraulic press, for in the modes hitherto adopted, the volume of water injected at every stroke of the piston of the pump was the same, but as the resistance of the press increased, the power necessary for working the pump increased also; by the above improved means however, the requisite power is uniform, and the quantity of water injected at every stroke, progressively diminished.

[*Inrolled September*, 1824.]

To James Tullock, *of Savage Gardens, in the City of London, Gentleman, for his invention and discovery of an Improvement or Improvements in the Machinery to be employed for Sawing and Grooving Marble and other Stone; or in Producing Grooves or Mouldings thereon.*

[Sealed 12th April, 1824.]

The machinery to which these improvements are proposed to be applied, is shewn in Plate XVIII. at Fig. 7. *a, a*, are the side walls of a building in which the machinery is erected; *b, b, c, c*, and *d, d*, are beams extending along the building; *e*, is a block of stone intended to be

cut into slabs; *f, f*, is a horizontal frame in which the saw or any number of saws, are to be mounted for cutting the block of stone, in a perpendicular direction, into slabs; *g, g*, are two chains coiled round barrels upon the horizontal axle or shaft *h*, to the extremities of which chains two sliders *i, i*, with friction rollers *k, k*, (shewn by dots) are attached. These sliders carry the frame of the saws, the under sides of which, when moved to and fro, run upon the friction rollers.

To the shaft or axle *h*, a pully wheel *l*, is affixed, and a chain passes round this wheel with a weight at bottom, for the purpose of counterbalancing the saw frame and its sliding carriage. It is, however, necessary that the weight of the saws should preponderate, in order that they may bear upon the stone, in the act of cutting, and descend as the operation goes on.

The power of a steam engine, or any other first mover, is to be applied to the axle of the toothed wheel *m*, which causes the two lesser toothed wheels *n, n*, to revolve. Upon the axles of these last mentioned wheels, there are cranks from which rods *o, o*, extend to the vibrating beam *p*; and to this beam also the saw frame *f*, is connected by the rod *q*; the part by which the rod *q*, is attached to the vibrating beam being suspended by a chain from the axle *h*, in the same manner as the carriages of the saw frame, and hence all of them descend together.

It will now be seen that by the rotation of the wheels *n, n*, the vibrating beam *p*, is put in action, and the saws moved to and fro. The person who attends the operation supplies grit or sand, as it may be required for cutting, and a constant dripping of water is afforded from the cocks of the water tub above.]

The peculiar features of novelty, claimed by the

patentee are 1st, the inclined planes at the ends of the saw frames, which by running upon the rollers *k*, at the commencement of each stroke, raise the saws up and allow the sand and water to descend in the fissure; 2dly, the rollers, chains, and other apparatus employed in supporting the reciprocating saw frame, by which the motion of the saws, when in the act of cutting, is kept perfectly horizontal.

Only one set of apparatus for sawing is shewn in the figure, but it is in the contemplation of the patentee to work two sets by the same means; and for this purpose he erects a similar description of machinery, on the right hand side of the standard and wheels, to that shewn in the figure on the left hand, and connects to the cranks of the wheel *n, n*, similar rods to *o, o*, for the purpose of actuating the other machinery, in the way described above.

The same contrivances are also applicable to the working of grooves and mouldings in marble or other stones, for chimney pieces, pilasters, cornishes, and other straight ornaments by the employment of indented cutters, which are made to traverse to and fro, on the face of the stone, in like manner to the saws, and the improved mode of suspending the cutter frame by chains keeps it perfectly horizontal, and prevents the possibility of the softer parts of the stone being worked away before the harder parts.

[*Inrolled October*, 1824.]

To Herman Schroder *of Hackney, in the County of Middlesex, Broker, for his Invention of a new Filter.*

[Sealed 11th August, 1824.]

This filter is constructed by compressing a large bag into a narrow tube, and causing the water intended to be

filtered, to pass through this tube, between the folds and insterstices of the bag, by which the foul particles contained in the water will be arrested, and a clean liquor discharged at bottom.

The filtering bag is proposed to be made of cotton cloth, closely woven, in the proportions of about three feet long, and four feet in circumference; this bag is to be forced into a metal tube of a few inches diameter, and something longer than the bag, so that the bag may be extended, and its sides laid in plaits or collapsed together. In the mouth of the bag, a conical funnel is to be introduced, the broadest part downward, and a ring sliding upon the funnel being drawn over the folds of the bags mouth, presses it tight against the funnel, and holds the bag securely. The smaller end of the funnel is now to be screwed into the bottom of the vessel containing the water to be filtered, and the water being allowed to descend slowly through the folds and interstices of the bag, will be discharged at bottom in a clarified state.

It is not absolutely necessary that the external tube should be of metal, as it might answer the purpose equally well, if made of sacking or any other strong material; but it is desirable that it should be longer than the bag within, in order to allow the water to pass off freely, otherwise the external bag or tube might be likely to burst. Many of these bags and tubes may be attached to the under side of one vat, or other vessel, containing the water to be filtered, their dimensions being of course suited to the intended magnitude of the process.

The patentee says he does not confine himself to any particular materials of which these filtering bags shall be made, nor to any definite sizes, but claims as his invention the constructing of filtering apparatus, by means of bags folded or collapsed within tubes, in the manner above described. [*Inrolled, February*, 1825.]

To JOHN HAM, *of West Coke, in the County of Somerset, Vinegar Maker, for his new invented improved process for Manufacturing Vinegar.*

[Sealed 7th October, 1824.]

THE object of the patentee is to expose the liquor of which the vinegar is to be made, as much as possible to the action of the atmosphere; and for this purpose he proposes to employ an apparatus that shall not only constantly keep the liquor in agitation, but shall also run it over extended surfaces, and cause it to be separated into drops, that the air may act upon the liquor in its most divided state, and thereby increase the acidity, and promote its rapid convertion into vinegar.

There are no drawings accompanying the specification; but it is proposed to make an aperture in the lid of the vat or other vessel, containing the liquor previously fomented, and to insert a pump through this aperture, extending to the bottom of the vat, and rising a little above the lid. This pump may be worked by any suitable mechanical power, and which is not only to produce the alternating strokes of the piston, but also to cause the pump to be turned round horizontally.

The upper part of the vat, containing the liquor, is to be occupied with small twigs or bushes, piled upon bearings placed across in the middle; and near the top of the pump, immediately under the lid of the vat two or more spouts are inserted for the discharge of the liquor raised by the pump; and also in the sides of the vat, near its top, there are to be perforations for admitting the air to the interior.

The apparatus being thus prepared, and the liquor to be operated upon occupying the lower part of the vat, the pump is now put in action, when a quantity of liquor raised at every stroke of the piston will be thrown over the surfaces of the bushes, and these dripping from twig

to twig, will in that divided state be submitted to the action of the air within the vat, and as the pump continues to revolve, every stroke will throw the liquor on to a different part, and by that means keep the liquor constantly flowing over the whole surface of the bushes, and descending by drops to the bottom.

In this way, by continually pumping, it is intended that the air shall act upon the liquor, and in the course of about fifteen or twenty days the vinegar will be completely made. The acidification of the liquor may however be still further promoted by causing a rapid circulation of the air within the vat, and this is proposed to be effected by employing a blowing machine to force air through the apertures near the top of the vat, or by employing an exhausting air pump, which shall draw the air from the vat, when fresh air will force its way into the vat, and thereby produce a constant current.

This process may be carried into effect by apparatus constructed in a great variety of ways; it is not therefore the intention of the patentee to confine himself to any particular forms or dimensions, as he considers that he is entitled to the exclusive exercise of this principle of operating in every way that it may be carried into effect.

[*Inrolled February*, 1825.]

To JOSEPH LOCKET *the elder, of Manchester, in the County of Lancaster, Engraver to Calico and other Printers, and Copper Roller Manufacturers, for his Invention of certain Improvements in producing or manufacturing a Neb or Slot in the Roller, Shell, or Cylinder, made of copper or other metal, used in the Printing of Calico, Muslin, Cotton, or Linen Cloths.*

[Sealed 14th January, 1825.]

THE patentee first describes the mode of making copper

or other metal cylinders for calico-printing, and then points out the particular features of the process, which he claims to be new, and his invention.

These cylinders are prepared from ingots of copper or other metal, by heating them in furnaces to a red heat, and then passing the ingots through fluted rollers in the ordinary manner of rolling metal into cylindrical rods. The rods are then cut into lengths suitable for making the printing rollers, and in their hot state are thrown into water for the purpose of cooling them and removing their scales. When cold these cylinders are examined, and whatever flaws or other faulty parts appear are cut out by a chisel or file.

The cylinder is again introduced into the fire, and heated to redness, when it is to be passed through the rollers a second time to compress the metal and bring its surface smooth. After this it is to be heated a third time, for the purpose of softening or annealing it, and is then beaten with a swage hammer upon a hollow anvil to compress the pores of the metal.

The cylinder is now to be bored for the purpose of admiting an iron mandril or axle, which axle is to have upon its surface a rising piece as a neb, or a recess as a slot, the cylindrical shell being drawn on to this mandril, and great pressure exerted upon its external surface, the copper will give way, allowing the iron neb to insinuate itself into the solid metal of the shell, and also the copper to be forced into the slot or recess in the mandril. This particular mode of forming the neb or slot in the copper roller, shell, or cylinder, constitute the subject of the present invention.

[*Inrolled March*, 1825.]

[See Attwood's Patents for Improvements in Cylinders for Calico Printing, vol. vii. p. 285, and the present vol. p. 307.]

To ALEXANDER NESBITT, *of Upper Thames Street, in the City of London, Broker, in consequence of a communication made to him by* WILLIAM VAN HOUTEN, *the Younger, a Foreigner residing abroad, for a process by which certain Materials may be manufactured into Paper and Felt, or a substance nearly resembling coarse Paper or Felt, which material so prepared is applicable to various useful purposes.*

[Sealed 27th July, 1824.]

THE material to be employed for this purpose is moss, such as grows upon low heaths and moors in Holland, and which may be found, as the patentee supposes, in many parts of England. This moss is to be gathered, washed, cleaned, and dried, and then cut into short lengths in an engine such as is employed for cutting tobacco. The cut moss is then to be mixed up in the manner of preparing pulp for making paper; and when so mixed is to be moulded into sheets, in a frame, as paper is moulded. The sheets are then to be pressed in a heap between blankets, and afterwards hung up to dry upon lines, as paper. When perfectly dry the sheets are to be again pressed, in order to bring the material into close contact; and they may then be considered as fit for use.

This paper or felt is proposed to be employed for sheathing of ships' bottoms, between the wood-work and the copper, and also for lining between the thicknesses of planking: it is proposed as an infallible preventive against leaking, as, upon the insinuation of water between the joints of the copper or wood-work, this felt or paper will absorb the wet as a sponge, and thereby swelling will fill the vacant spaces, and render the vessel water-tight.

Such a material has been for some time employed in

the Dutch navy, and has been found perfectly efficacious in keeping the vessel dry; and so extremely durable is moss, that the patentee considers it will never decay, but will remain sound and effective as long as the wood-work of the ship lasts.

[*Inrolled January*, 1825.]

To Philip Taylor, *of the City Road, in the County of Middlesex, Engineer, for his Invention of certain Improvements on Steam Engines.*

[Sealed 3d July, 1824.]

These improvement have for their object the prevention of unequal friction in the working of pistons, that move in steam cylinders, either in horizontal or inclined positions. This object is proposed to be effected by passing the piston rod through both ends of the cylinder, and by keeping the rod in a state of tension, by means of weights acting at each end of the rod.

In order to render this more evident, let it be supposed that the working cylinder of a steam engine, is fixed in a horizontal position upon brick work, and that the rod of the piston is extended in a straight line, and passed through both ends of the cylinder, the apertures being properly packed, and the rods running upon anti-friction rollers in frames, for the purpose of keeping its action parallel; and that at the extremities of the piston rod, bridles or sweep rods are attached, which are connected to double or right angled levers, these levers being for the purpose of giving the up and down motion to pump rods below the base of the engine.

It will now be perceived that in an engine so constructed if the piston be made to reciprocate in the cylinder by the alternate expansion and exhaustion of the steam, that the long rod will move to and from, and work both the right angle double levers, raising the pump rod at one end and depressing it at the other, and *vice versa.* It will also be seen, that under these circumstances the piston rod will be supported in all parts of its movement, and prevented from rubbing unequally; and this will be further aided, and the rod prevented from binding by the tension produced by the weight of the levers and pump rods at the extremities.

In this way several cylinders may be connected together, and their powers made to act simultaneously upon one point, their rods being in the manner above described connected by bridles or sweep rods to the right angle levers below. This contrivance is applicable to engines that are worked either by expansive steam alone, or by exhaustion, or by the principles of expansion and exhaustion combined. The force of the engine, or combined engines, constructed as above, may be directed to one end of the piston rod, by placing a weight upon one of the levers, " equal to half the power of the engine and weight of the pump rod; this weight will be raised by half the power of the engine in one direction, and its gravity, added to the power of the engine in the other direction, will concentrate the total power on the rod."

The patentee states his claim for novelty of invention to consist in " the mode above described, of preventing the unequal friction of pistons working in cylinders either in a horizontal or inclined position, by passing the piston rods through both ends of the cylinders, and by keeping such rods in a state of tension by means of weights or loads acting on each end of such piston rod; and the

modes above described, of combining engines with cylinders placed in a horizontal or inclined position, so that they will work simultaneously, by which means the power of several such engines may be concentrated upon one point."

[*Inrolled January*, 1825.]

Novel Inventions.

Method of Moulding Figures in Wood, called Ligneous Stucco.

A CLEAR size is to be made of five parts of Flanders and one of fish glue, which are put separately into water, and mixed together after having passed through a linen cloth or fine sieve. The quantity of water cannot be stated because all glues are not of the same strength; the sufficient degree of liquidity is only known by letting the mixture get quite cold when it should become a stiff jelly. A few trials will shew the proper degree of strength. The glue thus prepared should be heated until it becomes painful to hold the finger in it; a paste is then to be made of the dust of the wood intended to be moulded.

The dust should be made either with a fine rasp or with the shavings of the wood dried in an oven, and pounded, or with saw-dust sifted through a fine sieve. This paste is to be laid two or three tenths of an inch thick in a mould of plaster or sulphur, the surface having been rubbed with linseed or other oil, in the same manner as when mouldings are taken in plaster. While this first paste is drying another is preparing with the dust, of the

wood, which has not passed through the fine sieve, but through a course one. The mould is to be entirely filled with this second paste, which gives consistency to the first; it is then to be pressed heavily, so that the paste may receive all the forms of the mould. The mould is then left till the cast has become sufficiently dry, it may then be taken out without the danger of breaking.

The time for withdrawing the cast from the mould is easily known by its shrinking; but first it is necessary to take off all the composition that exceeds the height of the mould with a knife, so that it may present a plain and smooth surface; the substance not being entirely dry is more easily cut than afterwards. These ornaments are afterwards glued on the furniture for which they are intended, and if designed to be of the same colour as the wood, a little spirit varnish should be used. Considerable attention is necessary, and the operator should be well acquainted with the process to know when they are properly mounded. These ornaments are generally gilt, and remain very solid. Cabinet-makers could make more tasteful and appropriate ornaments by using paste composed of different woods than they now do, and with much greater ease than by carving.

New mode of manufacturing Glass.

M. LEGNAY has invented a new method of manufacturing glass without the use of alkali. He has obtained a Brevet's d'invention, in France, and the following is the process:—Take 100 parts of dried sulphate of soda, 656 parts of silica, and 340 parts of lime, which has been exposed to the air. All these materials must be mixed with the greatest exactness. The furnace and the pots must

be heated till they are of a redish white colour, when the mixture should be put in little balls into the pot until it is filled. The mouth of the pot should then be stopped up, and with its contents introduced into the furnace; and as soon as it is perceived that the material has sunk in the pot, more of the same mixture must be put in, until the pot is filled with a melted vitrious substance. A strong fire must then be continued, in order to obtain a complete fusion in as little time as possible. When the fumes diminish small portions must be taken out at different times, to ascertain whether the glass be sufficiently refined, which generally becomes so in about twenty-two hours. This glass is then fit for use: it may, without risk, remain double the time in the furnace.

Another mode proposed:—To take 100 parts of muriate of soda, well dried, 123 parts of silica, 92 parts of lime, which has been exposed to the air, well mixed together, and fused in the same way as above described, in sixteen hours a good glass will then be obtained, which will be fit for use for any purpose that may be required.—*Description des Boevet's d'Invention*, vol. viii.

Improved Fire Engine Pump.

M. Ulrich Schenk, the younger, Engineer of Bernois, has obtained great celebrity by his inventive genius, and the manner in which he finishes his machinery. Many of the mathematical instruments which he has manufactured have been equal to the very best that have been produced in London, Paris, or Munich. More than fifty fire engines have been made by him for the Canton of Berne and its environs. He has recently invented a new construction of pump, which possesses advantages of greater

importance than any which have been heretofore made by him. It is placed upon a carriage that can be easily moved, being only seven feet long, and which can pass through very narrow places, and by the means of a simple mechanism the shaft can be raised up, and easily adapted to the purposes of a fire-engine. It is so constructed as to act immediately on the fire, and at the same time to supply other pumps with water which are in action. When it is only used for the latter purpose, it will convey water to four or five common engines at the same time. To the body of the pump is adapted a bag that acts as a sucker, the mouth of which is twelve lines and a half in diameter; this bag is placed in a reservoir with which the pump is supplied, and by every stroke of the levers seven *pots* and a half of water are sent into the pump.

The levers are moved by twenty-four or twenty-eight men, and throw the water, uninterruptedly, with violence to the distance of 100 or 120 feet, with a force that will without difficulty raise the stones in the streets and the roofs from the most elevated buildings. The water, if desirable, may be distributed into three pipes, each of these pipes will furnish by every stroke of the piston two *pots* and a half of water, but will then not throw it quite so great a distance as when a single pipe is used. In this respect, however, the difference is very inconsiderable, if the three pipes are increased in length.

The pump is so constructed that the water from two pipes may be immediately directed against the fire, whilst the other may be employed in filling one large or two small engines with water.

If sixty strokes of the piston be given in a minute this pump will draw up in that time 450 *pots* of water, which is equal to the utmost that could be done by three common pumps, if the cylinders were six inches in diameter,

and from ten to twelve inches high; while the ordinary construction of fire-engines of similar dimensions to this improved one throws out only 150 *pots* of water per minute, and requires twenty or twenty-four men to work them. Schenk's fire-pump supplies three times the quantity of water, and needs only the assistance of four additional men.—*Bulletin des Sciences Technologiques.*

On the Property of Zinc, to prevent the Rust of Metals, by M. Bake, *Sub-director of the Iron Cannon Foundry, in the Low Countries.*

After having referred to the Memoir of Sir H. Davy on this subject, the author in order to procure for himself the satisfaction of observing the preservative power of zinc, took two circular brass plates, each presenting a surface of 454 inches, and having fixed to the middle of one of them a button of zinc, of fifteen inches surface, put each of the plates into a leaden vessel filled with sea water. The plate without the zinc had scarcely been twenty-four hours in the water, when it had not only lost its metallic brightness, but had deposited a green sediment in the water; that with the zinc though the proportion of the surface of zinc to that of brass, was so inconsiderable, remained unaffected; this small quantity of zinc having preserved the brass from the influence of the sea water. The plates remained more than fourteen days in the salt water, till the whole of the water had evaporated, there was then at the bottom of the vessels containing the first plate, a deposit of the kind above-mentioned, and in the other having the zinc attached, a white powder, which appeared to be composed of muriate of zinc and argyle;

the zinc button had lost its metallic brightness, its surface was diminished, but the brass was unaffected by rust. M. Bake afterwards made the same experiment on iron, by taking two plates of this metal, each presenting a surface of 127 inches, and attached to one of them, a button of zinc, nearly fourteen inches in its surface, he suspended the two plates by threads at some distance from each other in a damp vault: after two days they were a little affected by rust, when they had remained two days longer in the same situation, the plate without zinc had still more rust, while the other had undergone no additional change. He afterwards placed the plates in the open air by the side of each other, the rain which was then falling, caused them to be covered with rust, but that with the zinc was the least affected by it. After leaving them in the same situation four days longer, he cleaned them, the first was easily brought to its original state, but not the second, which was more strongly impregnated with rust. After they were cleaned, he put them into two porcelian vessels filled with water, in the proportion of five of salt to 250 fresh; in less than 24 hours, that which was without zinc had made a red deposit, which coloured the whole; this was sensibly increased in 48 hours, and in four days the transparency of the water was entirely lost; the other plate with the zinc attached to it, had deposited a white substance and muriatic acid. The zinc button was a little tarnished, but not much diminished in size.—*Bulletin of Science.*

Distilling Sea Water.

THE apparatus employed for making salt water fresh having commonly been found to be too complicated and

cumbersome for use on board ship, M. Coning has succeeded in the construction of a ship kitchen, which encloses an apparatus, by which, with no more heat than what is requisite for the ordinary cooking, a sufficient quantity of food may be daily distilled for the use of the ship's company. The experiments which have been made have perfectly succeeded, and the Patriotic Society of Sleswig Holstein, at Altona, intend employing this apparatus in a vessel upon a long voyage. It is obvious that if this experiment should completely succeed, the advantage will be incalcuable.—*Leipzig Liter. Zeit.*

Patents granted in the Prussian States, 1824.

Seventeen patents have been granted during the last year in the kingdom of Prussia, of which the following are the most important:—

The first is for the invention of a machine to shear the pill of woollen cloths, by M. Poupart, of Sedon. 2d. An apparatus, by means of which silver may be separated from its alloy of brass, and gold from its alloy of silver. The same machine may also be used to dissolve the brass by means of sulphuric acid. 3d. An apparatus of some considerable size, for the preparation of oil, which will prevent the bad effects attending its being prepared by fire. 4th. An improved portable gas lamp, with a new method of preparing cloth designed for painting upon, by covering it with a substance which renders it as smooth as parchment.

The remainder are of minor importance.

Polytechnic and Scientific Intelligence.

Enterprize Steam Vessel.

By an extract from a Letter, dated Cape Town, Oct. 14, we learn the above vessel has reached the Cape in safety, the commander considering, though the voyage has been rather long, that he has fully established the practicability of a steam-vessel weathering the open ocean under all circumstances.

The experience that has been gained will in future obviate many of the difficulties and disadvantages that has been sustained during this voyage of experiment. In the first place, the engines were not large enough for the tonnage of the vessel, for in the calmest weather they were never able to make more than eight knots per hour.

Another mistake seems to have been the little regard paid to the sailing department, and certainly not the least, the inefficiency of the crew. It seems they met with extraordinary heavy seas and head-winds, difficulties that might have been surmounted but for the want of fuel, which ran short; thereby, causing them to steer in an indirect course, and losing ten days. The commander is very sanguine in favour of the undertaking, and feels convinced of the certainty of performing such voyages in safety.

The slavery to the crew of shipping coals, will be removed, as it is intended to establish depots, and so only fill the coal boxes forward, which will suffice for fifteen days consumption, by this plan the vessel will be enabled to stow a considerable quantity of cargo. Great praise is bestowed on the excellence of the machinery, for

in steaming for ten days together, there was only occasion for ten minutes stoppage to oil its various parts. The vessel being forced to deviate from its course, put into St. Thomas's for water, and received the greatest civility from the Governor, who is a Portuguese General.

Arctic Expedition.

THE verdict of the Court Martial which sat upon Lieut. Hopner, having exonerated him from all blame in the loss of the ship Fury, under his command, it is expected that he will be again appointed to a ship, and proceed on a voyage of discovery in the same regions, early in the spring, in order to co-operate with Capt. Franklin, who will be upon the look out. The accident which disabled the ship was truly unfortunate, as at the time of the Hecla's leaving P. Regent's Inlet, the sea was perfectly open to the westward, and presented every prospect of a successful progress; but the peremptory orders of the Admiralty were, if one of the ships became disabled, to return home immediately.

The expedition had abundance of provision and stores, and the Hecla not affording sufficient stowage for so great a number of persons, as the crews of both ships, the provisions and stores were unavoidably left behind, they were however carefully packed together on land and covered with snow. The food was secured in tin cases, of which enough has been left to victual the crews for between two and three years. A considerable quantity of gunpowder also, packed in cases remains, which it is very probable if discovered by the Esquimaux, will be exploded, and produce most mischievous consequences. The instruments are all brought back, and deposited at Woolwich,

Land Expedition.

By the latest accounts from Quebec, which have arrived up to the 8th ult. it is stated, that news has been received there of the safe arrival of Captain Franklin and his party, in their winter quarters, after a prosperous journey.

New Nautical Machinery.

A French newspaper states, that a man named Ignazio Roberto, of Troina in Sicily, has invented a machine with which ships may be moved by hand instead of steam-engines. Three persons, one of whom works an hour and rests himself two, are sufficient to move a vessel of twenty tons, and so in proportion to larger vessels. The expense of the machine is from 600 to 1000 ducats. He affirms that he has made repeated trials of it, and offers to apply it to any vessels for which it may be required, and indemnify the proprietor for the first two trials if the machine should not act satisfactorily.

The reporter has forgot to mention the speed with which the vessel is to be moved. An ounce will lift a ton weight, but as the power is increased, the speed diminishes. This is probably a new invention, the principles of which, have been known ever since the days of Archimedes.

Lieut. Kotzebue's recent Voyage of Discovery.

Dispatches have been received from this active navigator, from the harbour of St. Peter and St. Paul in Kamschatka, where he had arrived on his retrun home. He has discovered three islands, one of which, called after his ship Predpriætige Island, is situated in west long. 140 deg. 2 min. 38 sec. and south lat. 15 deg. 58 min. 18 sec. The second, called Bellinghausen, after the eminent Russian navigator, is situated in west long. 154 deg. 30 min. and in south lat. 15 deg. 48 min. 7 sec. The third, called Kordaken, after his first lieutenant, is in west long. 168 deg. 6 min, and in south lat. 14 deg. 32 min. 39 sec. This island, however, had been previously discovered by M. Freycinet.

LITERARY NOTICES.

Effects of Hot Water on Flowers. The following is deserving of record, as an addition to what has hitherto been discovered on the subject of vegetable physiology, and as enabling the lovers of flowers to prolong for a day the enjoyment of their short-lived beauty.

Most flowers begin to fade after being kept 24 hours in water, a few may exist longer by substituting fresh water repeatedly; but all the most *fugacious*, (such as the poppy, and one or two others excepted) may be completely restored by the use of *hot water.* For this purpose place the flowers in scalding water, deep enough to cover about one-third of the length of the stem, and by the time the water has become cold the flowers will have become erect and fresh; then cut off the ends, and put them into cold water.

Italia in Pollonia.—The prospectus of a new work, by M. Ciampi, under this title, has been published at Florence. It is the result of the residence of the author at Warsaw, and of his particular occupations in Italy as a corresponding member of the Royal Commission of Public Instruction in the kingdom of Poland; and it will contain a history of all the religious, political, and scientific relations existing between the two countries.

Captain Batty's Views on the Rhine has reached its tenth part, with as much beauty and merit as its precursors. Among the views in this part will be found one of Oberwegzel—another of Wurrburg, which looks extremely magnificent —one of the Broken Tower at Heidelberg, picturesque in the extreme—and also one of the Stadt Huis, Delf, is a clear and beautiful plate. This publication approaches its conclusion with great credit to Captain Batty, the engravers, and publisher, who have faithfully observed their pledge to the public.

Milan.—Messrs, Fusi and Stella continue the publication of Popular Historical Abridgments, among those lately published, are the History of the Russian Empire, in six vols, by the Chevalier Compagnoire, already well known by several valuable works; the History of the Crusades, in 2 vols. by M. Bertolatti; the History of Portugal, in 2 vols, by the same author, and the History of Holland, in 3 vols. by Leonard Samitali. All these histories are remarkable for their clearness and simplicity. The wo:k with this accession amounts to a hundred and fifteen volumes.

The third and fourth parts of Lord Northwick's Selection of Ancient Coins, drawn by Del Frate, a distinguished pupil of Canova, and engraved by Henry Moses, with Descriptions by Dr. Nochden, will soon be ready.

SHACKELL, PRINTER, 11, KIRBY-STREET, HATTON-GARDEN.

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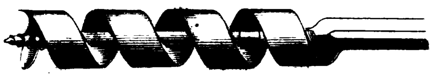

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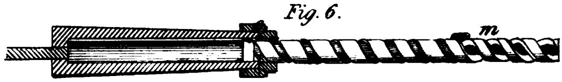

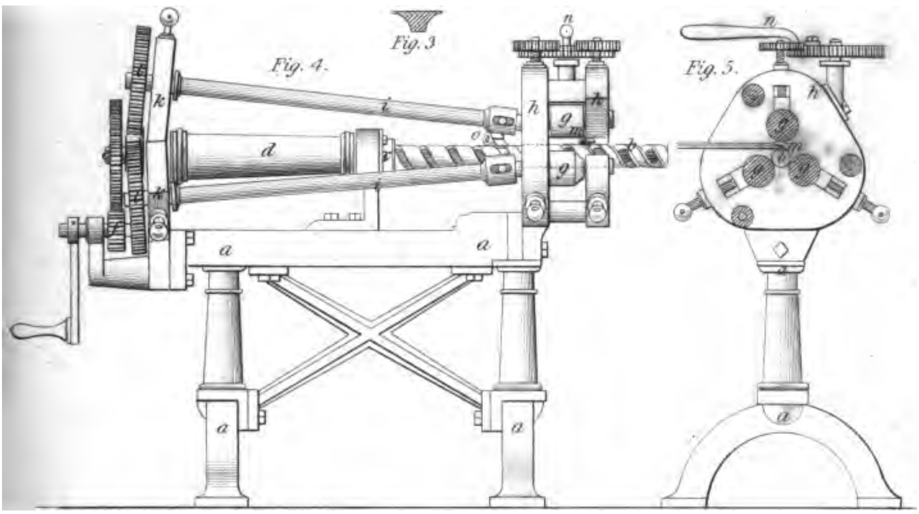

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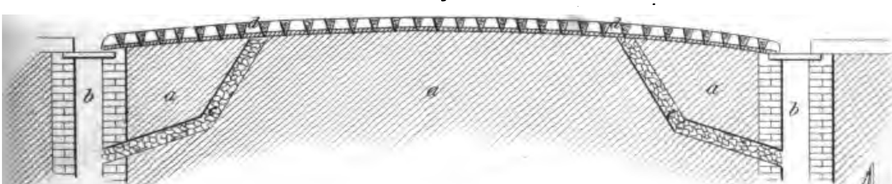

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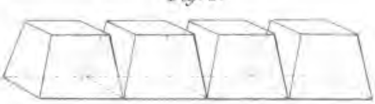

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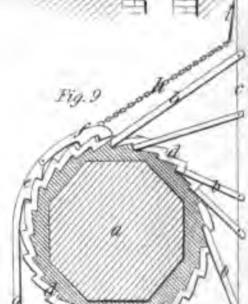

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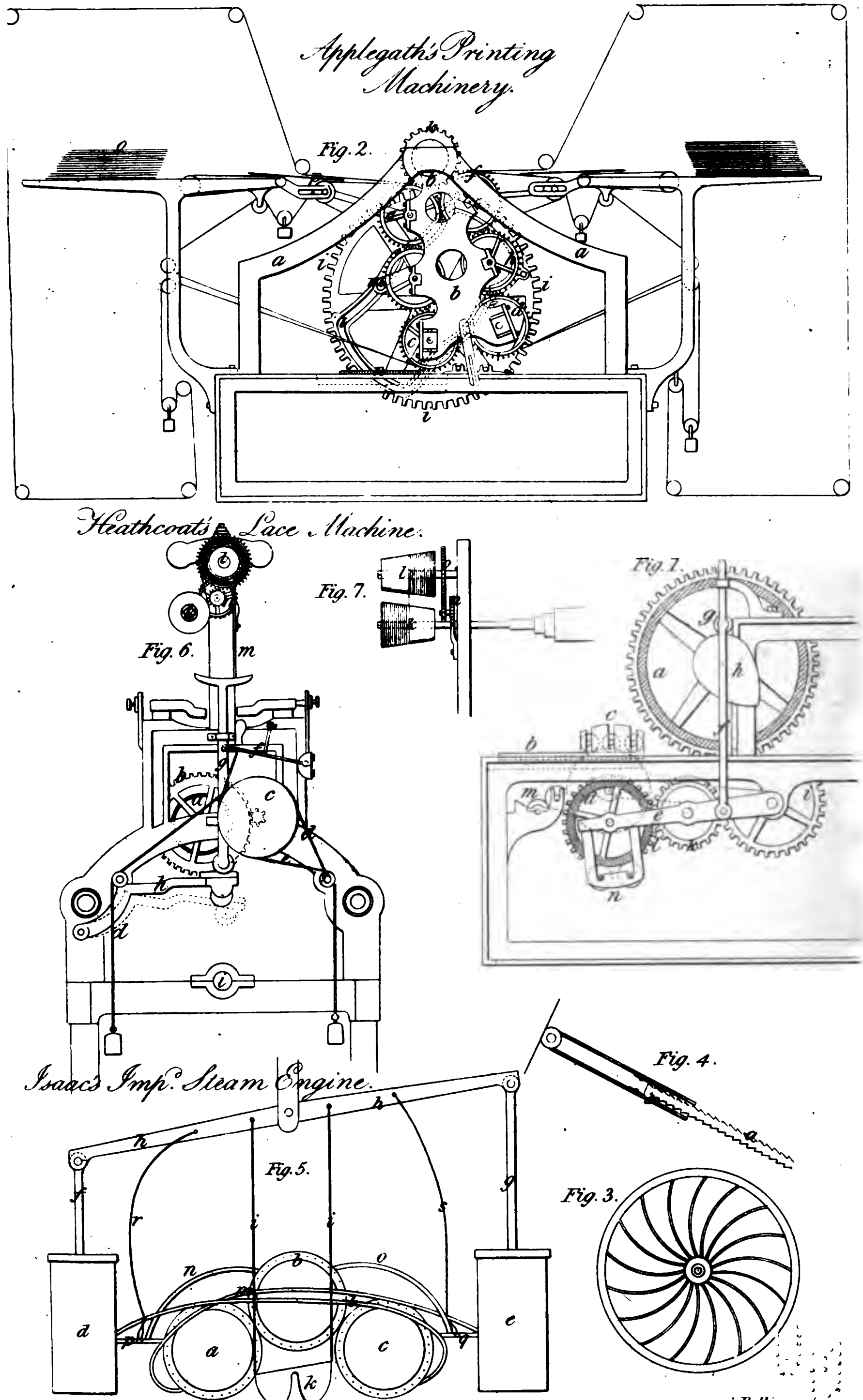
W. Newton del. 1st July 1825. S. Bellin sculp.



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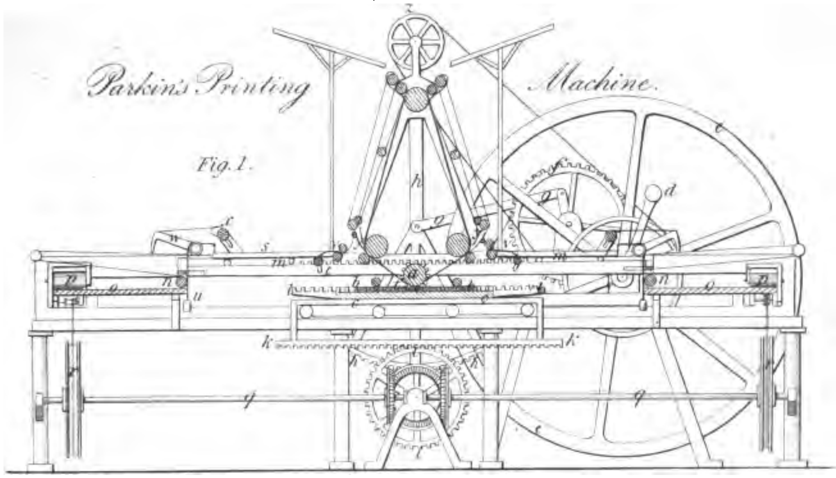

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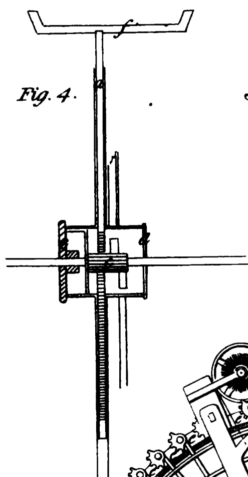

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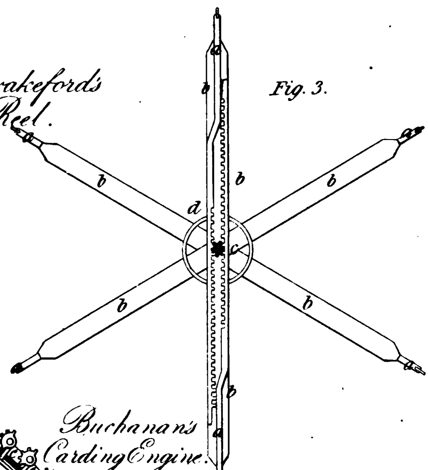

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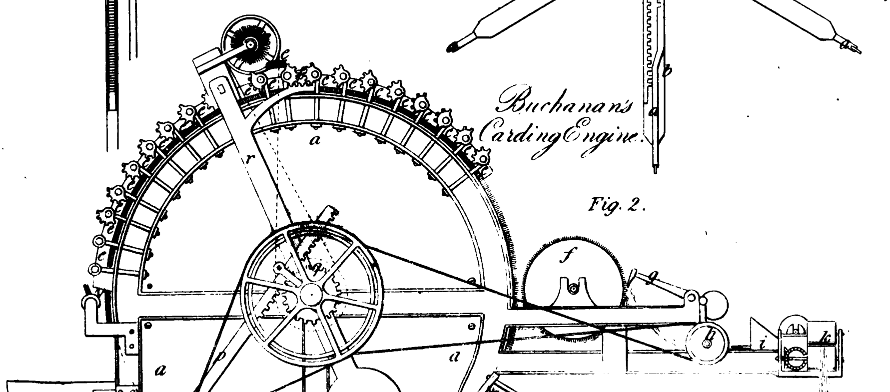

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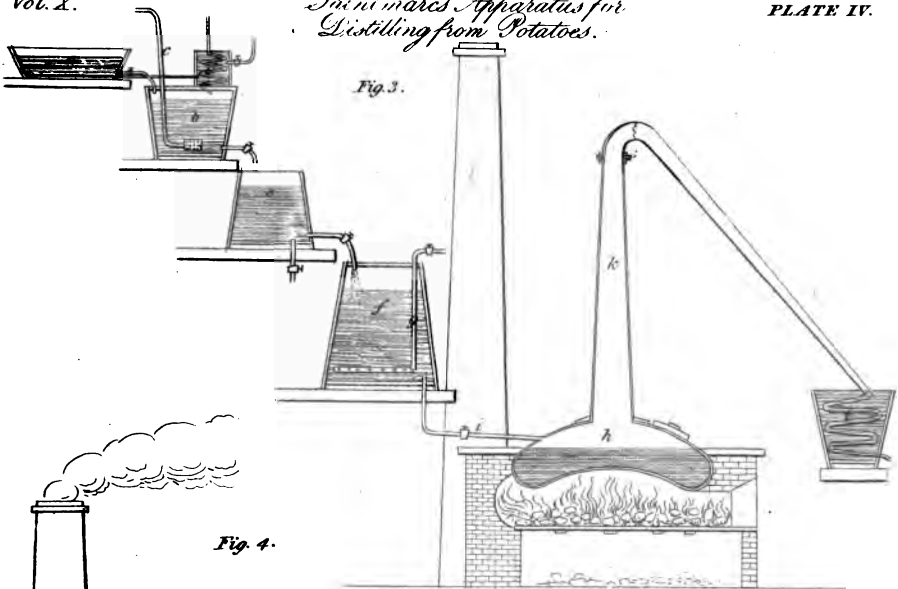

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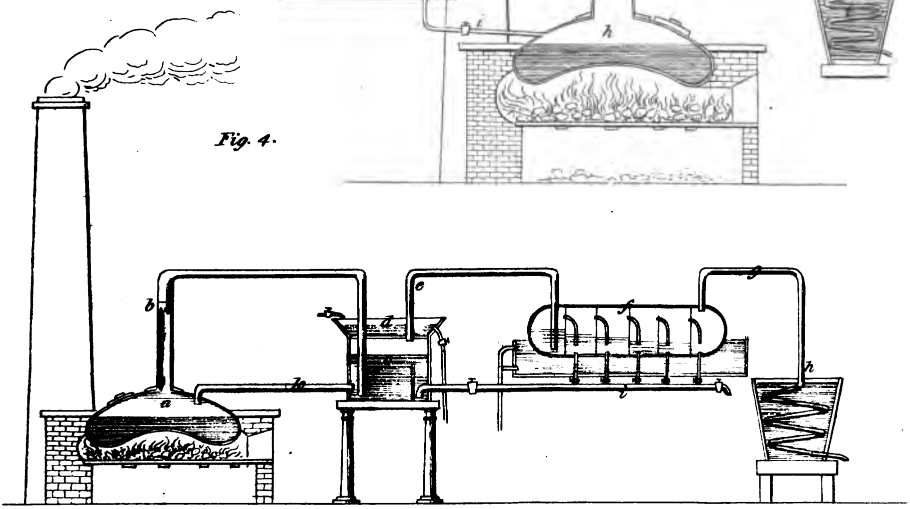

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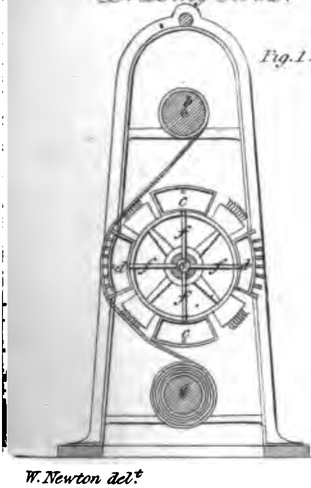

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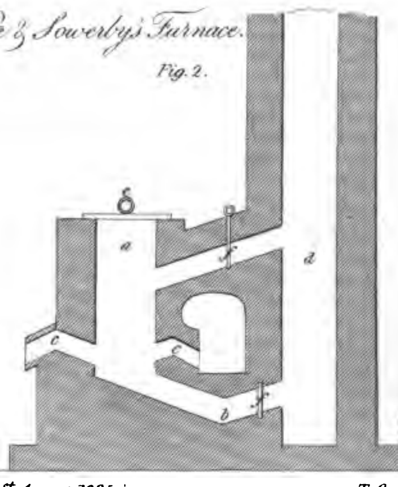

W. Newton delt. 1st August 1825. T. Owen sculpt.

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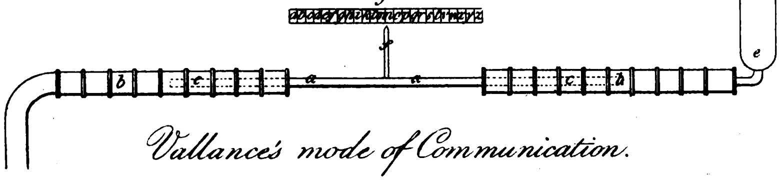

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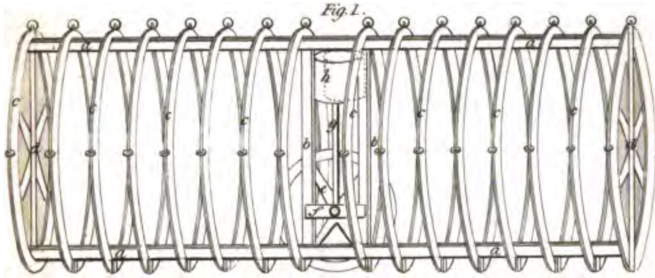

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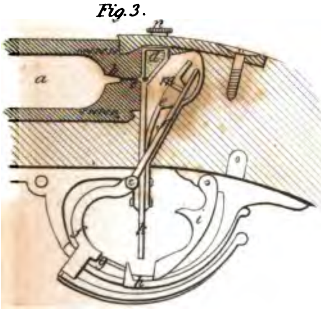

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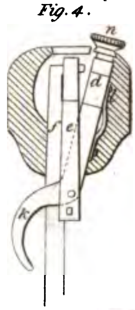

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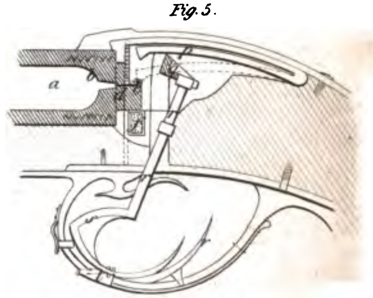

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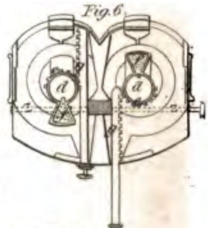

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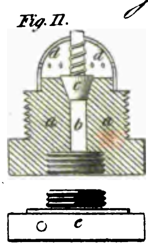

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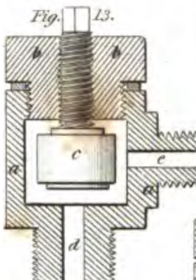

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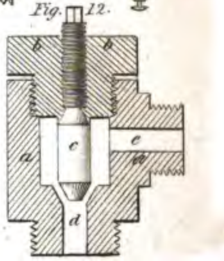

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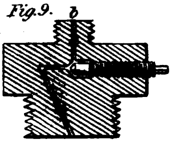

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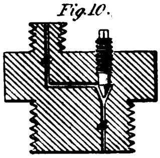

W. Newton del.t 1.st Sept.r 1825. S. Bellin sculp.t

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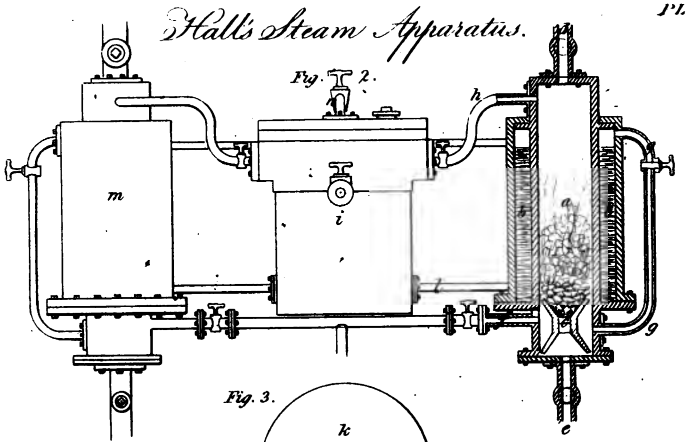

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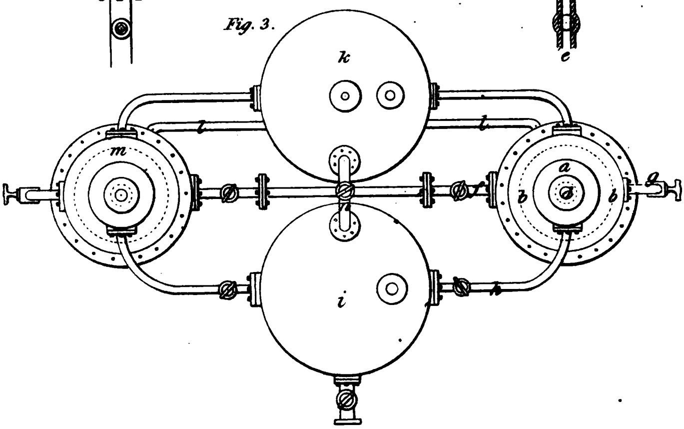

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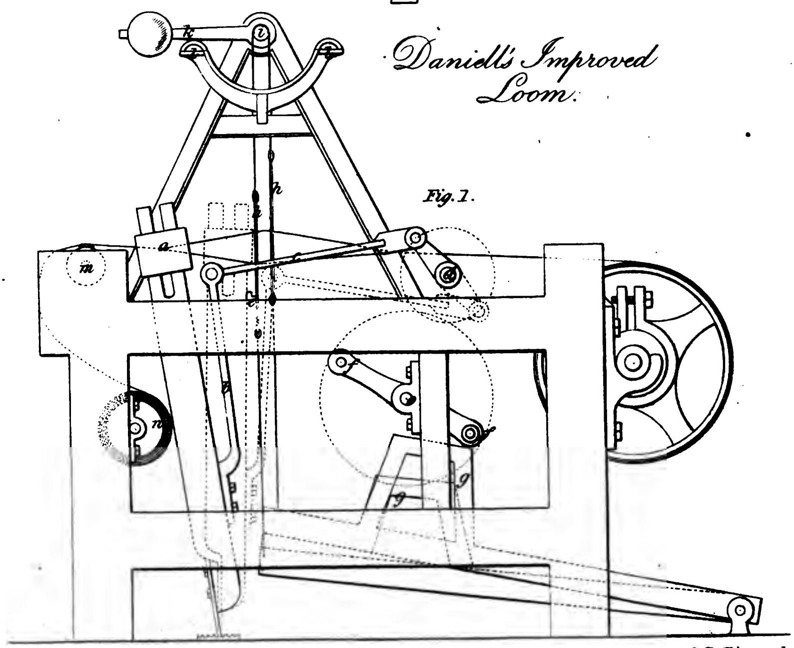
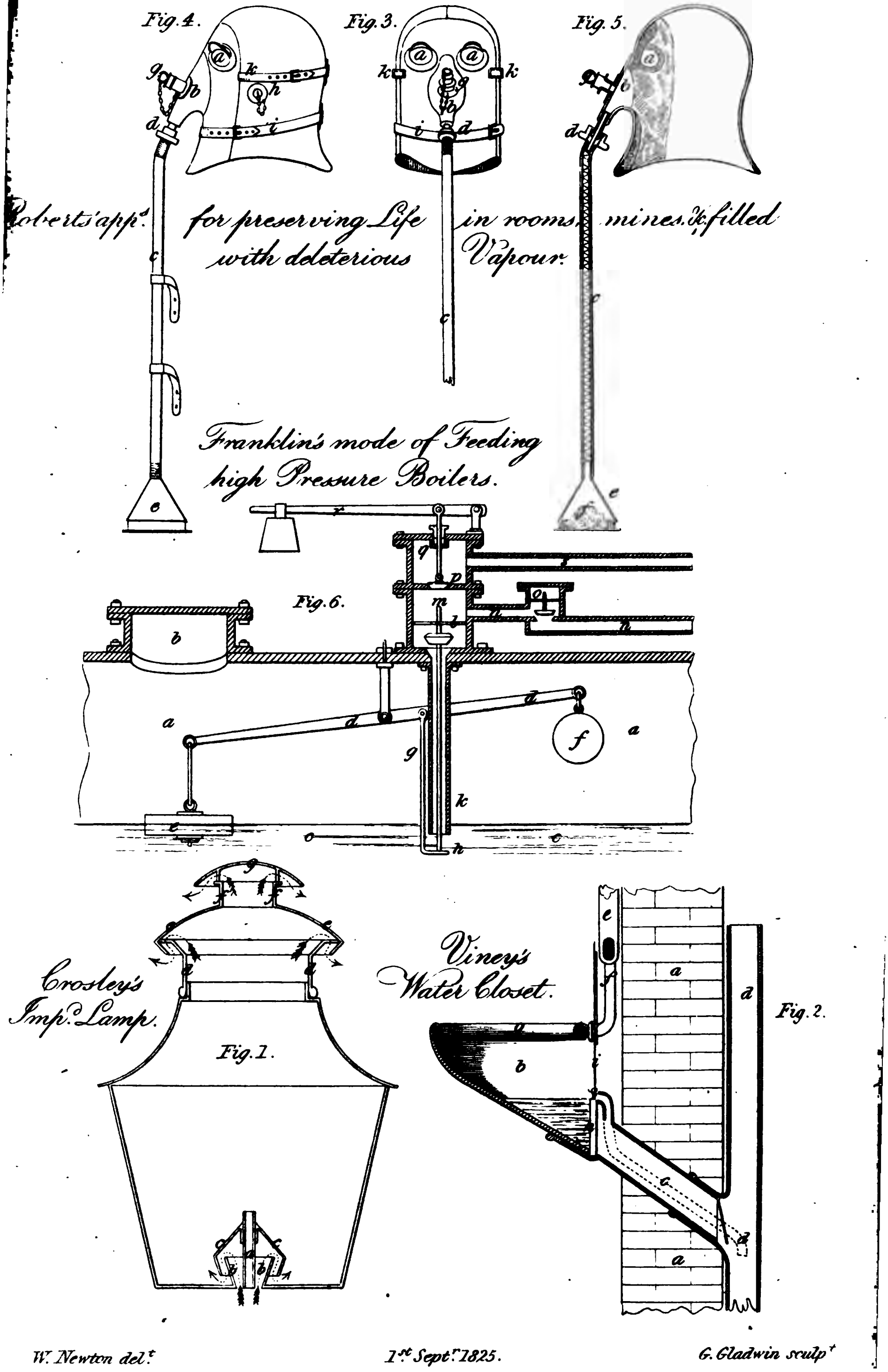


W. Newton del^t. 1^st Sept^r 1825. S. Bellin sculp^t



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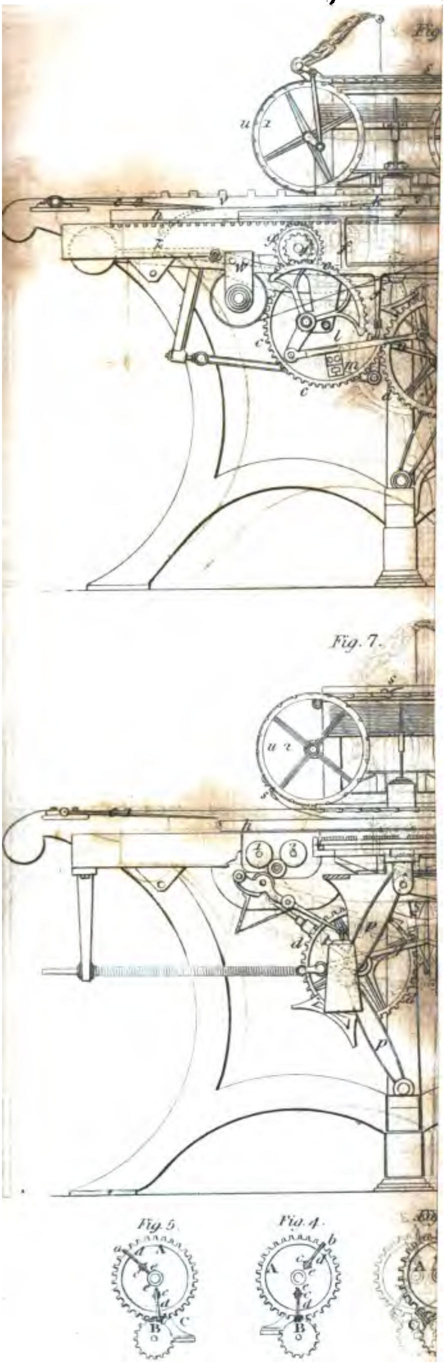

W. Newton del.t

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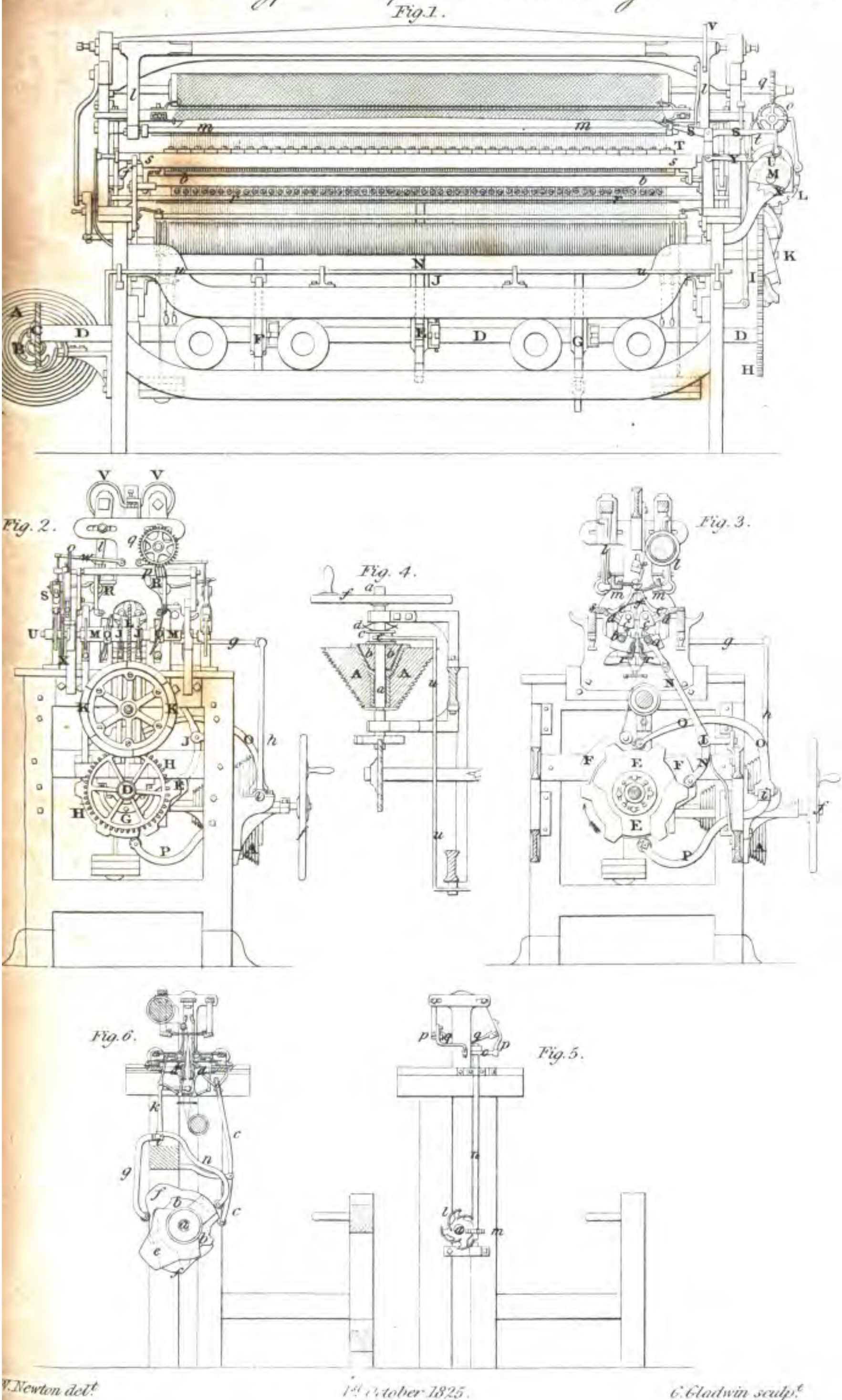

W. Newton delᵗ. 1ˢᵗ October 1825. G. Gladwin sculpᵗ.

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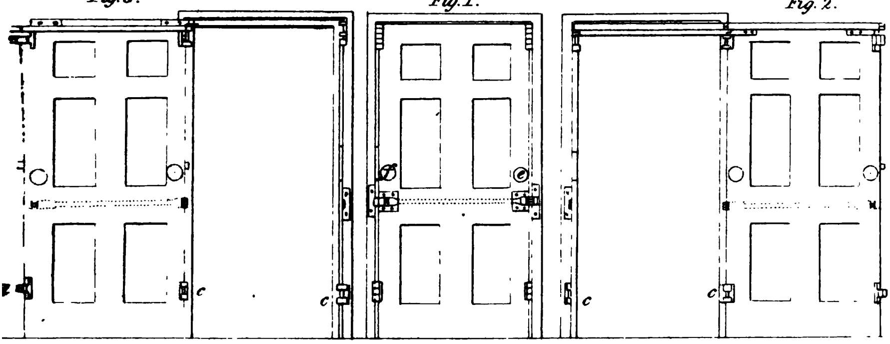

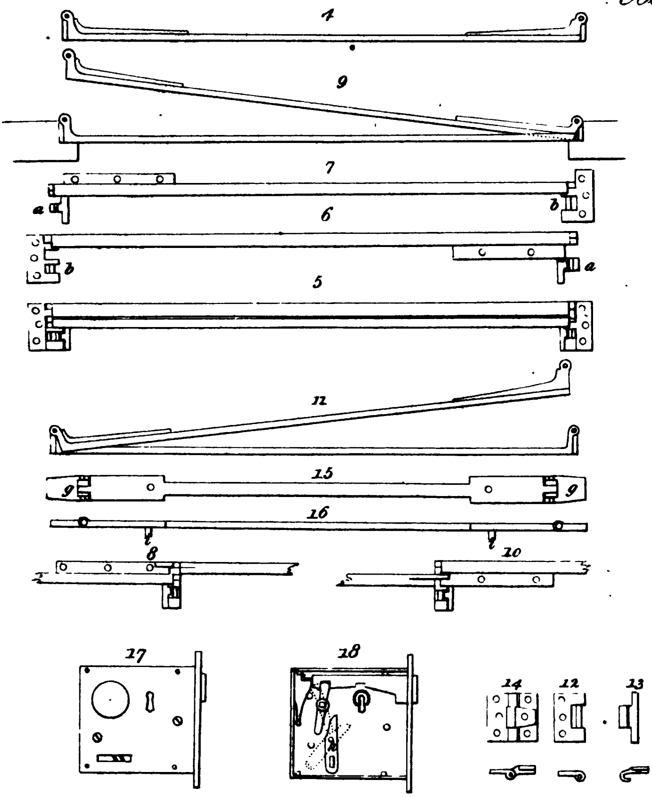

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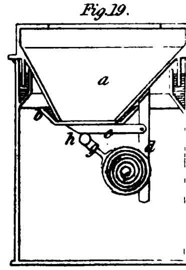

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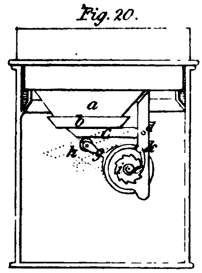

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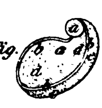

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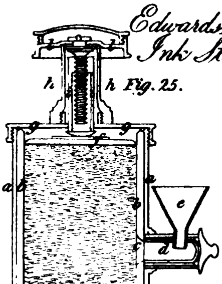

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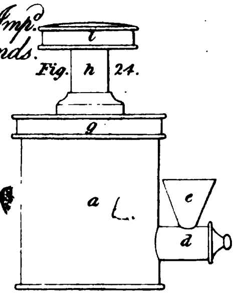

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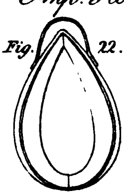

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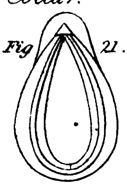

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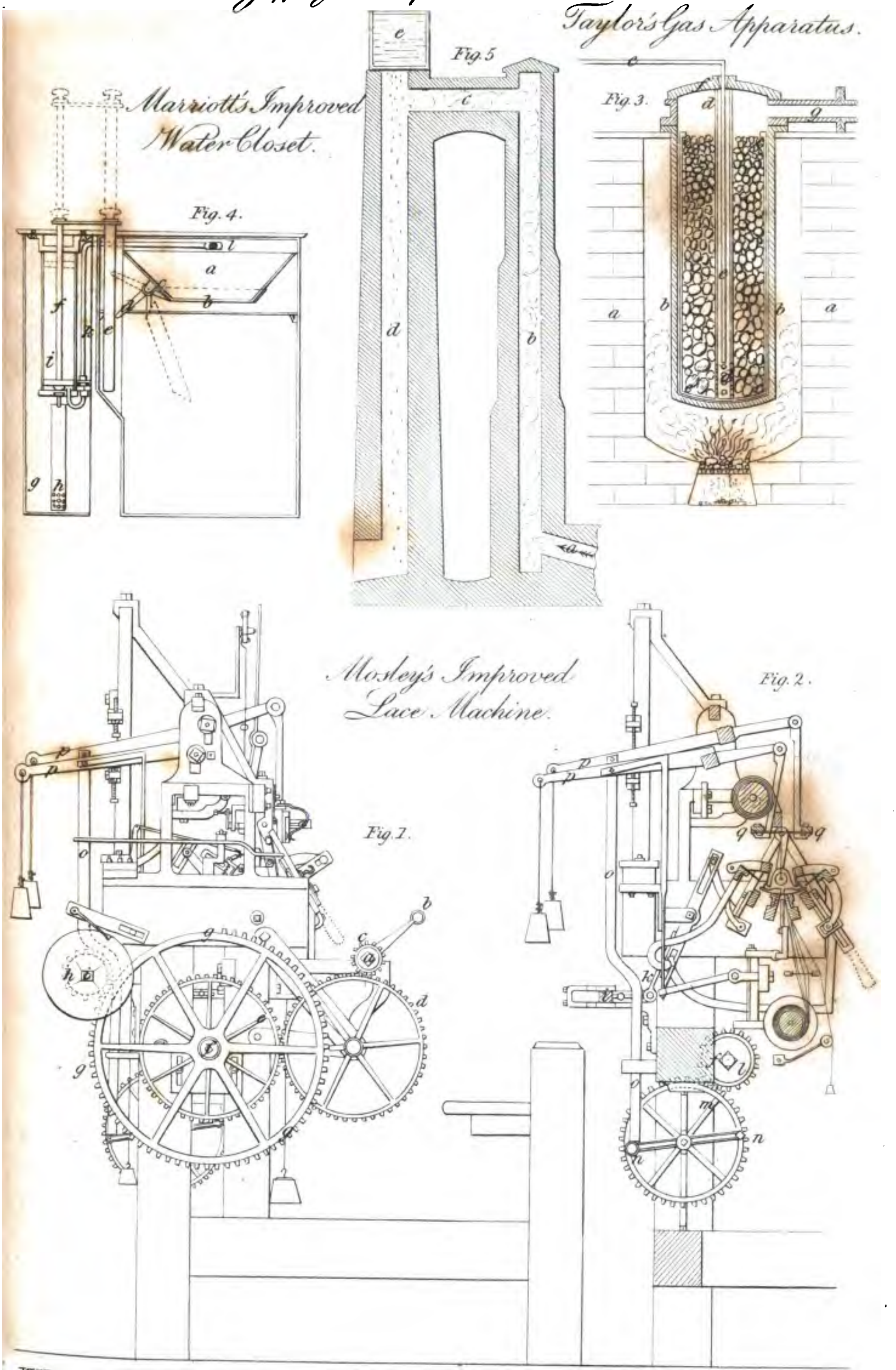

W Newton del^t 1^st Nov.^r 1825. G Gladwin sculp.^t

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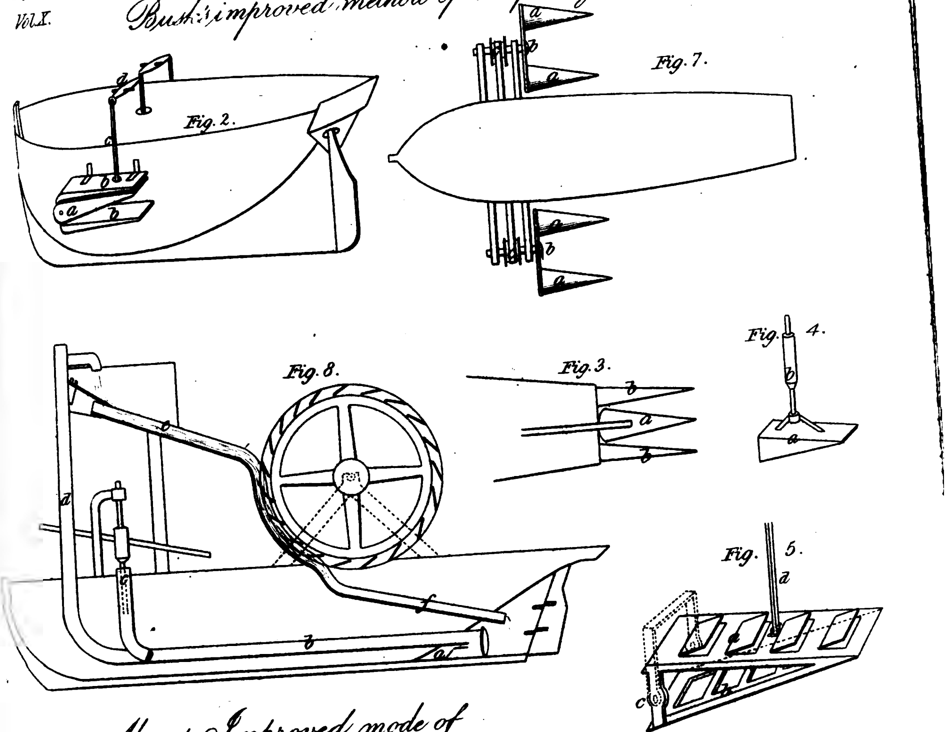

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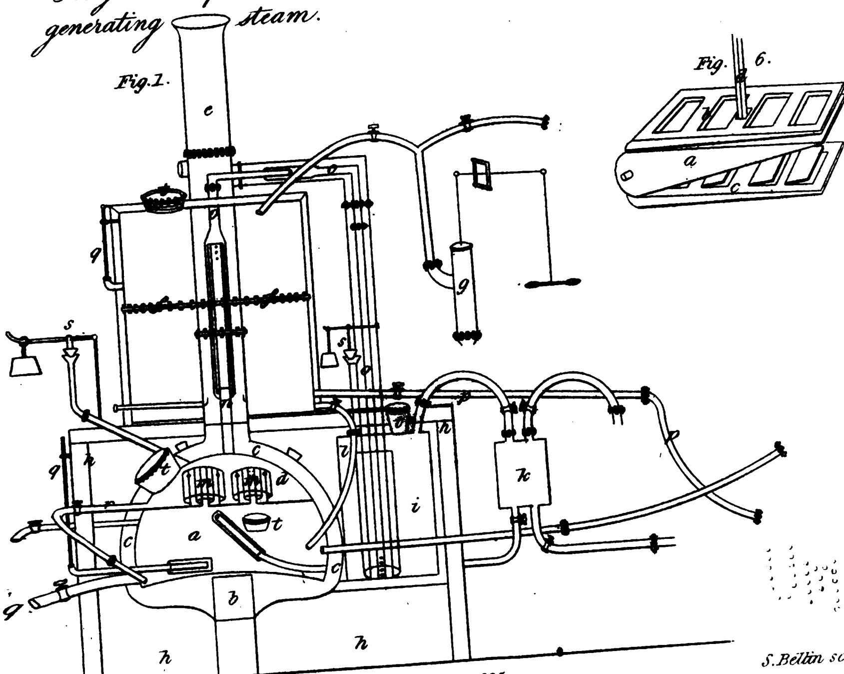

W. Newton delt. 1st Novr. 1825. S. Bellin sculpt.

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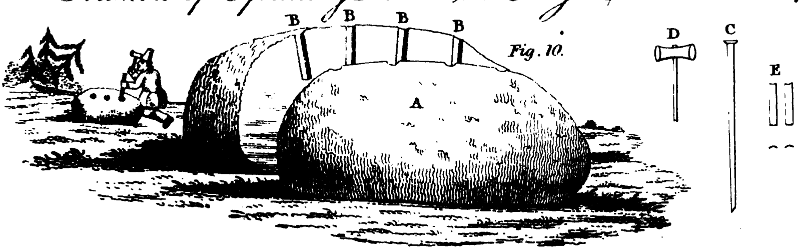

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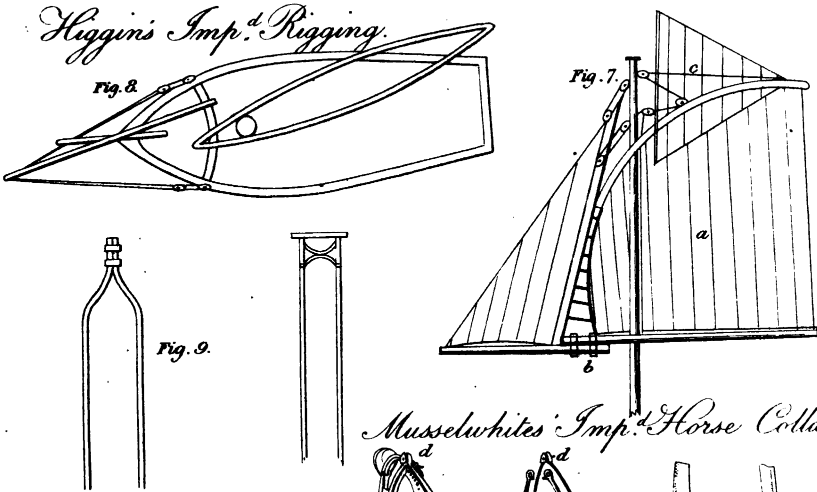

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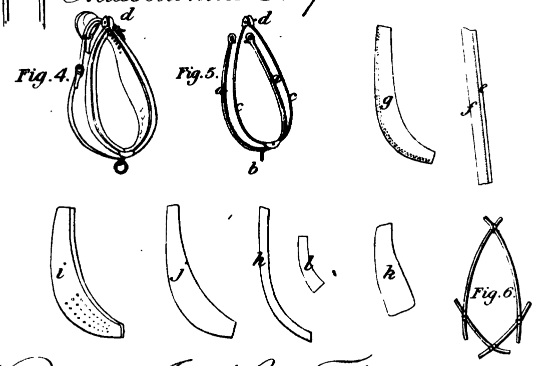

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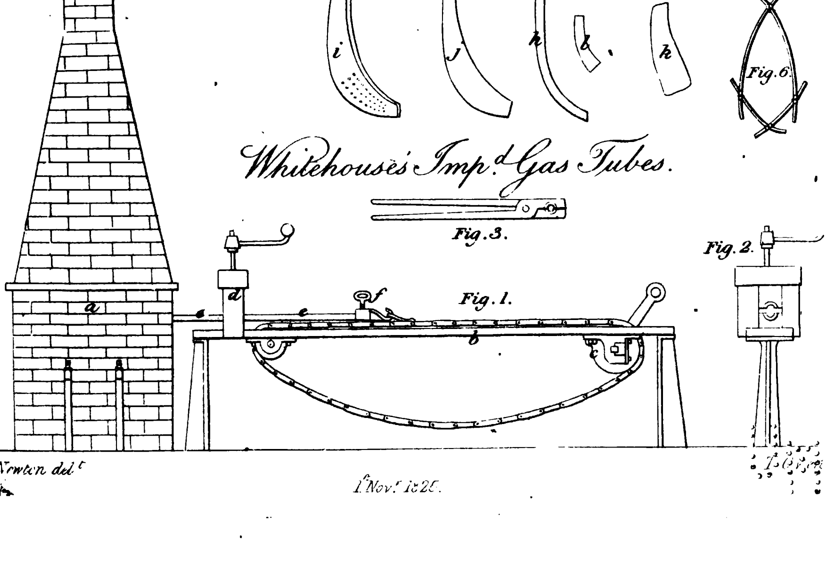

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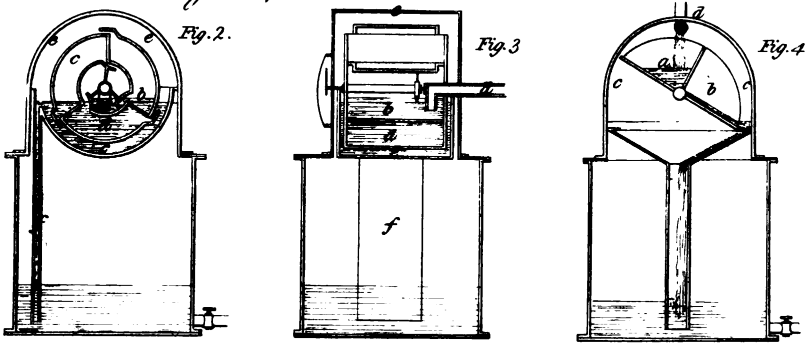

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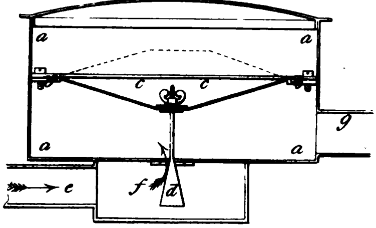

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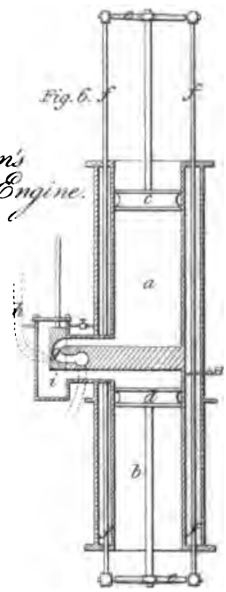

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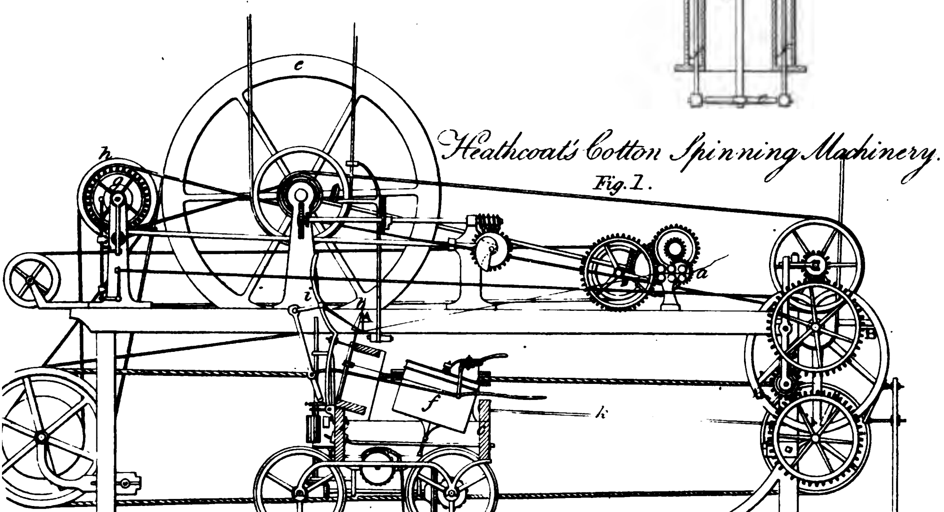

W. Newton del.t 1st Dec. 1825. G. Gladwin sculp.t

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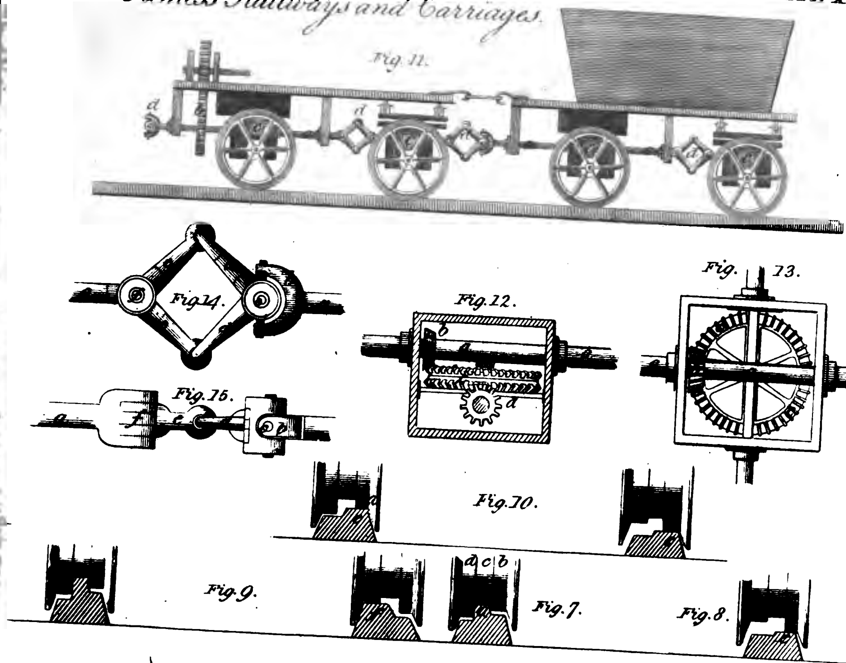

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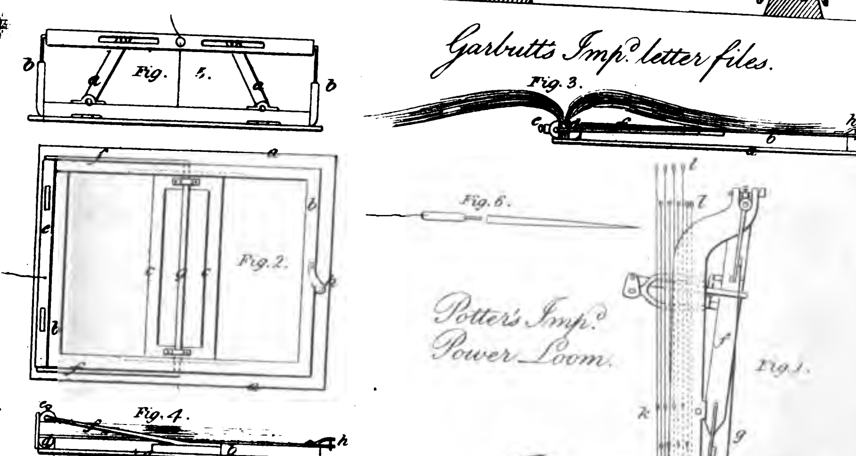

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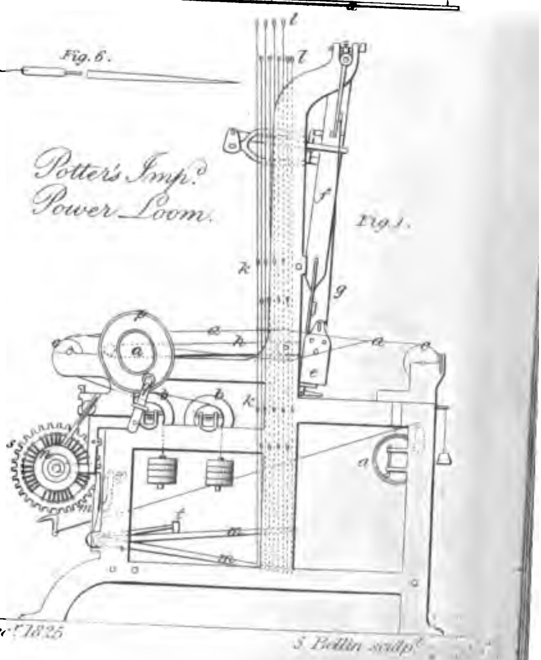

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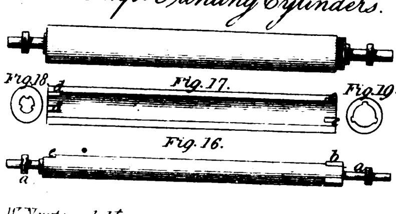

W. Newton delt.

1st Decr. 1825

S. Bellin sculpt.

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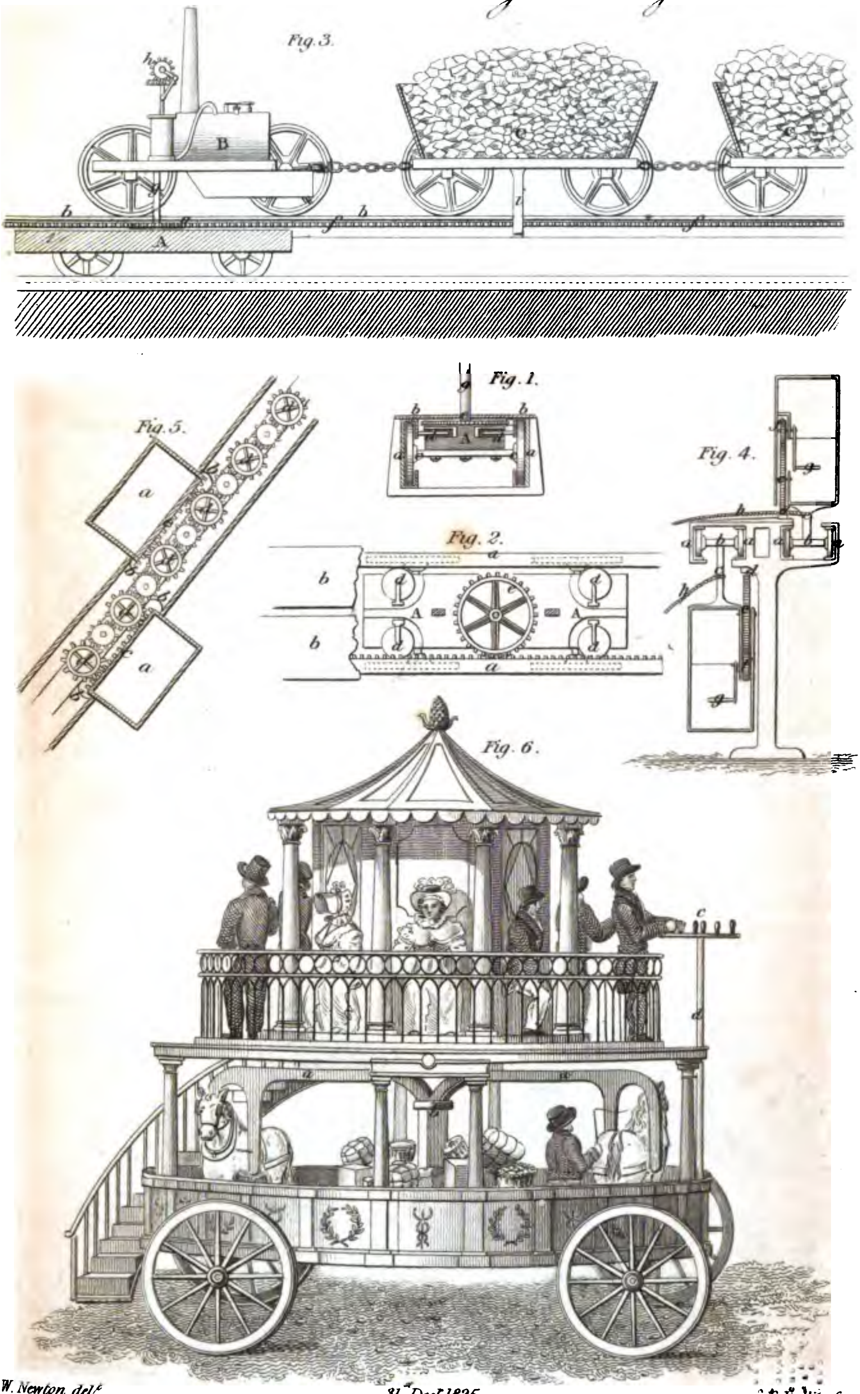

W. Newton del. 31st Decr 1825. S. Pelli... fc.

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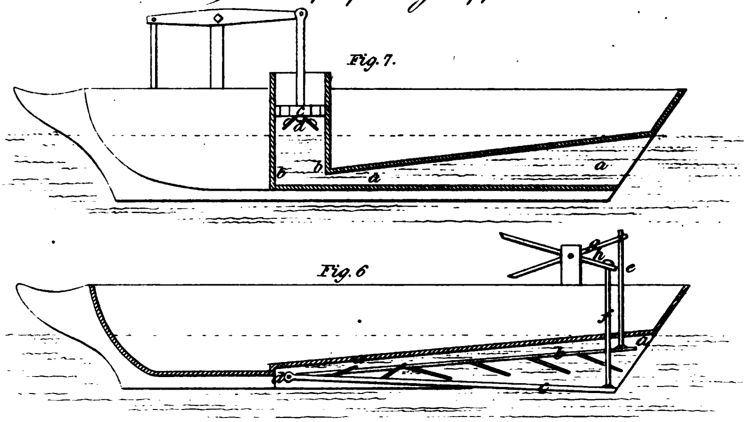

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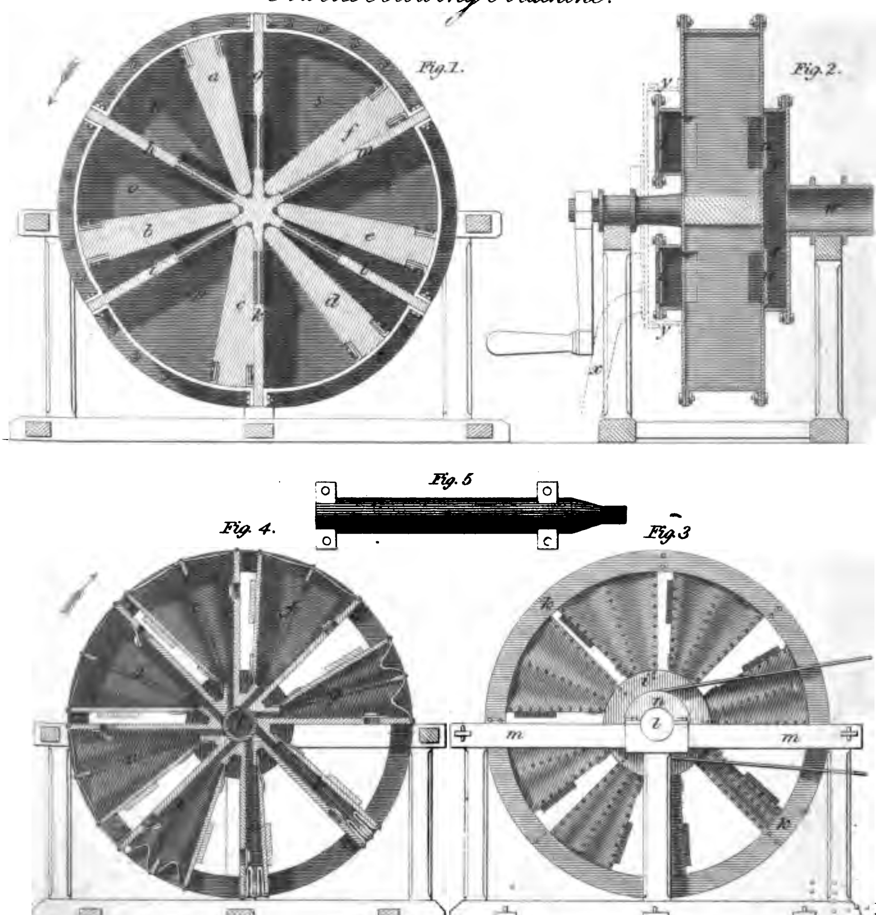


W. Newton delt. Dec. 31st 1825. G. Gladwin sculpt.

ickinson's Apparatus for Cutting & Pasting Cards.

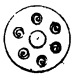


Fig. 3.

Fig. 2.

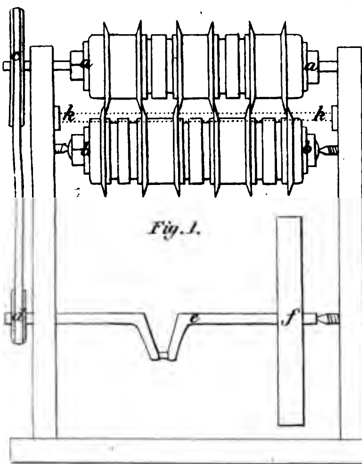


Fig. 1.

Fig. 4.

Heathcoat's Machinery for Preparing Silk.

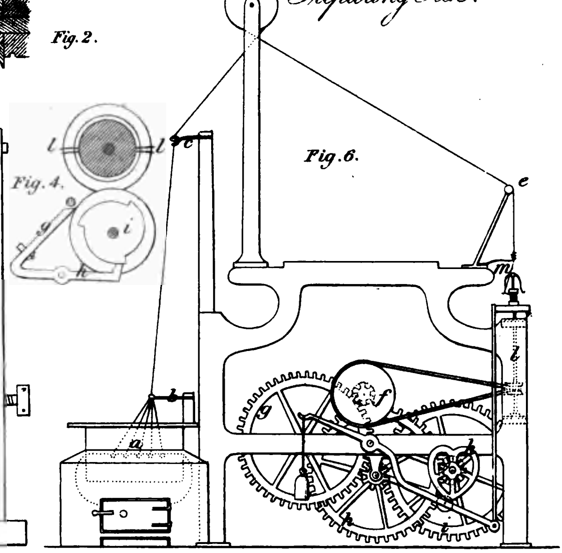
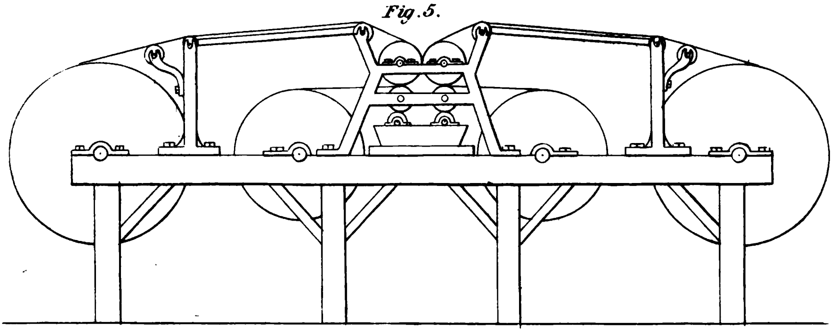


Fig. 6.

Fig. 5.



Tulloch's Machinery for cutting Stone.

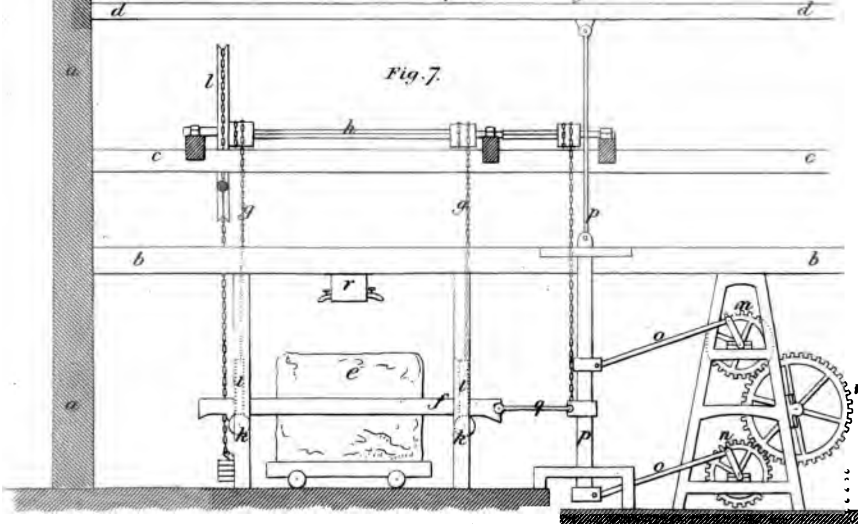


Fig. 7.